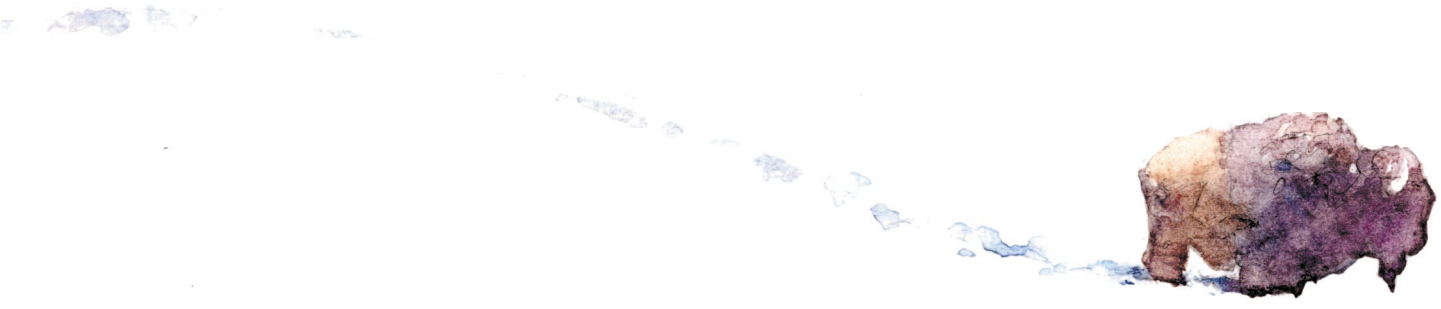
Bison Management Plan

for the State of Montana and Yellowstone National Park

RESPONSES TO COMMENTS

ON THE DRAFT ENVIRONMENTAL

IMPACT STATEMENT



VOLUME TWO

Responses to Substantive Comments on the Draft Environmental Impact Statement

Purpose and Methodology

The final environmental impact statement is to be an accurate analysis of impacts of the proposed action and its alternatives. Public and agency review of the draft statement helps to ensure quality.

On June 16, 1998, the *Draft Environmental Impact Statement for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park* was released for public review in a formal 120-day comment period. The U.S. Department of the Interior, National Park Service, and the U.S. Department of Agriculture, Forest Service, are the federal lead agencies. The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), is a cooperating agency. The state of Montana was also a lead agency when the *Draft Environmental Impact Statement* was released to the public; however, the state's status has changed, and they are no longer participating in this capacity (see volume 1, appendix C). Following requests from the public for more time to review the *Draft Environmental Impact Statement,* the agencies extended the comment period until November 3, 1998.

The *Draft Environmental Impact Statement* examined seven alternatives as a means of minimizing the risk of transmitting the disease brucellosis from bison to domestic cattle on public and private lands adjacent to Yellowstone National Park. The comment period generated 67,520 documents from the public, which contained 212,249 individual comments. Comments were received by letter, electronic mail, and verbally at a series of public hearings held in 13 cities across the United States.

Approximately 64,000 responses were submitted by individuals, 2,400 by organizations, 700 by tribes and tribal organizations, and the remainder by businesses, public agencies, and congressional representatives. Comments were received from every state and 48 countries.

Of those comments responding to the range of alternatives presented in the *Draft Environmental Impact Statement,* alternative 7 (the draft preferred alternative) received the greatest number (over 25,000) expressing concern about its proposed bison management actions. Of those commenting on the other draft alternatives, more concern than support was expressed by the public. There was overwhelming support for a "Citizens' Plan" alternative (over 45,000 comments), followed by a "Bison Alternative." Both alternatives, as well as others submitted during the comment period, are addressed in volume 1, "The Alternatives." These issues are summarized in a report entitled, "Content Analysis of Public Comment for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park" (Greystone Environmental Consultants 1999).

At the close of the comment period, the agencies began a content analysis of public responses to the *Draft Environmental Impact Statement.* Every document was read and sorted in terms of its subject matter and content. A number was assigned to each letter, electronic mail document, and verbal testimony given at public hearings. This number was used for tracking purposes and was entered into a database (the comment numbers are shown following the name of each responder in the "Index of Comment Letters by Category of Author"). As each document was read, codes were assigned to categorize the content, topic, and issue of each comment made in the letter. These codes were also entered into a data base for tracking purposes; they are shown in parentheses after the topic heading; for example, "Bison: Capture/Test/Slaughter Operations (BI-5)."

After each document was coded, a series of steps were taken to determine whether the individual comment was substantive or nonsubstantive, according to the criteria set forth in the Council on Environmental Quality regulations. Substantive comments are those that raise an issue regarding law or regulation, agency procedure or performance, compliance with stated objectives, validity of impact analyses, or other matters of practical or procedural importance. Nonsubstantive comments are those that offered opinions or provided information not

directly related to issues or impact analyses. Substantive comments require a response or a corresponding revision in the environmental impact statement text; nonsubstantive comments are used as background information for the EIS team, but do not require a formal response.

The purpose of reading, coding, and analyzing the contents of the comment letters was to assist the agencies in determining if the substantive issues raised by the public warranted further modification and study of alternatives, issues, and impacts. With the information provided through the review process, the agencies reconsidered the draft preferred alternative (alternative 7) and developed a "modified preferred alternative," as described in volume 1, "The Alternatives."

Organization of Comments and Responses

This volume contains a summary of the substantive comments received on the *Draft Environmental Impact Statement,* by topic and issue, and the agencies' responses to those comments. The topics are major headings, organized alphabetically, with subheadings reflecting the issues that were identified during the public comment period. These issues are further broken down into specific questions or concerns raised by the public. Substantive comments were addressed either in the comment and response section, the text of the environmental impact statement, or both places.

Volume 2 includes a table of contents of each topic and issue to aid the reader in locating a particular issue and the agencies' response. An "Index of Comments by Topic" is provided as well as an "Index of Comment Letters by Category of Author," organized by businesses; organization and educational institutions; federal, state, and local officials; and Native American tribes and tribal organizations.

A commenter will be able to find the response to a particular question by consulting the topic, issue, and subsequent question and answer. In some cases, summaries of the agencies' responses have been integrated into volume 1. Where applicable, changes to the environmental impact statement text are indicated in the response.

Volume 3 contains an index and copies of comment letters and portions of transcripts received from businesses; organizations; federal, state, and local officials; and Native American tribes and tribal organizations. Due to the number of individuals who commented on the *Draft Environmental Impact Statement,* their names have not been included in volume 3, but are available upon request.

Index of Comment Letters by Category of Author

Business Comment Letters

Abrahams, Loewenstein, Bushman and Kauffman — 3910. Alternatives: Citizens' Plan. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Adventurer Tours — 13442. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Wildlife: Brucellosis in Other Wild Ungulates.

All Aboard Travel — 7561. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution.

Allen, Jack, Attorney at Law — 11097. Bison: Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Socioeconomics: Reasonable Project Costs. Visitor Use: Winter Recreation.

Alpine Environmental, Inc. — 9079. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Andersons Arsenal — 2563. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Special Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.

Architectural Illustration — 14368. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Artistic Features Art Studio — 6152. Bison: Capture/ Test/Slaughter Operations. Livestock Operations: Public Grazing Allotments — Modify.

Aspen Trading Post — 11902. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution.

Audio Press — 14438. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Ayers Northwest — 9056. Visitor Use: Winter Recreation.

Ayurvedic Rehabilitation Center — 753. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates— Management Authority. Visitor Use: Winter Recreation.

Backyard Designs — 1434. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Special Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.

Baker Animal Hospital — 8926. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.

Baldwin Realty — 705. Bison: Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Blaise Hayward Studio — 9413. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Quarantine Operations, Vaccination.

Blue Water Publishing, Inc. — 10530. Alternatives: Alternative Plan B. Bison: Capture/Test/ Slaughter Operations.

Boesche, McDermott and Eskridge — 6201. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment. Socioeconomics: Social Values.

Boocks Farm — 16778. Bison: Capture/Test/ Slaughter Operations, Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception. Socioeconomics: Cost to Livestock Operators.

Bracer Consulting — 13417. Alternatives: New Alternatives/Issues.

Bruce Jackson Photography — 3795. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations, Distribution (Live), Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Overall Visitor Use and Experience.

C. W. Roders Enterprises — 3022. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.

Calvary Cemetery — 8066. Alternatives: Citizens' Plan.

Cambata Aviation Inc. — 6015. Alternatives: Citizens' Plan.

Cefali and Cefali Attorneys at Law — 1690. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

City Living Realtors — 7858. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population. Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Coffee Shaman — 794. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority

Compassionate Creations — 498. Bison: Capture/ Test/Slaughter Operations, Humane Treatment, Hunting, Quarantine Operations, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — modify, Cattle Vaccination. Visitor Use: Winter Recreation.

Coyote Creek Photography — 1786. Alternatives: Citizens' Plan. Socioeconomics: Social Values.

Crabtree Ridge Farm — 16577. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range

D. Lindsay Pettus Real Estate — 7034. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Daniel C. Hughes, Jr., Investment Properties — 10240. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination.

David L. Bourgoin Law Offices — 4104. Alternatives: Citizens' Plan. Bison: Capture /Test/Slaughter Operations. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Minority and Low-Income Populations.

David Spagat, Ltd. — 8011. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception.

Dawson Medical Group — 4408. Alternatives: Citizens' Plan. Bison: Distribution (Live). Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Diamond K Outfitters, Inc. — 10722. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Reasonable Project Costs.

Direct Response — 3822. Alternatives: Citizens' Plan. Bison: Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Don Devine's Studio — 7731. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Quarantine Operations, Vaccination.

Double Spear Ranch — 9063. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.

EB3 Ranch — 1722. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination.

Ecological Consulting Services — 13073. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting. Livestock Operations: Public Grazing Allotments — Modify.

Family Medicine — 7755. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Wildlife: Predators and Scavengers/Ungulates.

FaunaWest Wildlife Consultants — 10656. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Humane Treatment, Population, Quarantine Operations, Brucellosis in Other Wild Ungulates. Livestock Operations: Public Grazing Allotments — Modify.

First Alabama Bank of Birmingham — 262. Bison: Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range.

Georgia Surgical Associates, P.C. — 6623. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Geyser Gazette — 14367. Bison: Capture/Test/ Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Humane Treatment. Wildlife: Brucellosis in Other Wild Ungulates.

Goldstar Jewellery Pvt. Ltd. — 4536. Bison: Capture/ Test/Slaughter Operations, Hunting. Socioeconomics: Social Values.

H. F. Magnuson Company — 458. Bison: Capture/ Test/Slaughter Operations, Population, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Hagenbarth Livestock — 10638. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations, Distribution (Live), Population, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Vegetation/Vegetative Communities. Livestock Operations: Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics — Benefit and Cost Impacts, Cost to Livestock Operators. Wildlife: Brucellosis in Other Wild Ungulates.

Hakansson, Carl G., Attorney at Law — 1905. Alternatives: New Alternatives/Issues. Bison: Bison — Vaccination, Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Visitor Use: Winter Recreation.

Haney Truck Line, Inc. — 9030, 9031. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Reasonable Project Costs.

Heartland Realty Investors, Inc. — 8320. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.

Herbst Lazy TY Cattle Co. — 17856. Bison: Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Land Acquisitions/Easements or Winter Range. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators.

Hogue's Ravenoak — 10715. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live). Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Holmhaven — 2788. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception.

Indigo Girls — 14205. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations, Hunting, Quarantine Operations, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — modify, Cattle Vaccination. Cultural Resources: Archeology/ Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs. Wildlife: Threatened and Endangered Species.

Jack Atcheson and Sons, Inc. — 3627. Bison: Hunting. Visitor Use: Winter Recreation.
Jessie M. Harris, Flower and Nature Photography — 7373. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Wildlife: Brucellosis in Other Wild Ungulates.
Keenan Ranch — 9111. Bison: Population, Property Damage, Special Management Areas, Brucellosis Transmission and Public Perception. Socioeconomics: Reasonable Project Costs.
Kelly, Hart and Hallman — 8158. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Quarantine Operations, Vaccination, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Cost to Livestock Operators. Visitor Use: Winter Recreation.
King Ranch — 8829. Bison: Brucellosis in Yellowstone Bison Herd. Socioeconomics: Cost to Livestock Operators.
Kokopelli Books — 3339. Bison: Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Overall Visitor Use and Experience.
LaCrosse Associates — 13033a. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Quarantine Operations, Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Reasonable Project Costs.
Lake Area Hamilton Stores — 6332. Alternatives: Citizens' Plan. Bison: Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.
Lance W. Holter, Real Estate and Construction — 9439. Alternatives: Citizens' Plan.
Leonard, Street and Deinard — 9801. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators.
Lichtenfeld, Mark, Attorney at Law — 751. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use — Winter Recreation.
Light Touch Chiropractic — 5682. Bison: Distribution (Live), Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify,
Lockwood Properties Trust — 9649. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Lone Wolf Services — 15728. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception.
Lortz Manufacturing Company — 2861. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.
Mariposa Mobile Veterinary Service — 15729. Brucellosis — Transmission and Public Perception, Citizens' Plan, Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Meagher County News — 15377. Alternatives: Citizens' Plan. Bison: Hunting, Population, Vegetation/Vegetative Communities. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Metrics Unlimited Inc. — 3087. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.
Microban Products Company — 7014. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints:

Legal and Policy Mandates — Management Authority.
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Population, Special Management Areas. Livestock Operations: Cattle Vaccination. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.
Montana International Incorporated — 15252. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Overall Visitor Use and Experience.
Montana Livestock Ag Credit, Inc. — 2740. Bison: Distribution (Live), Population, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Visual Resources: Landscapes and Viewsheds. Wildlife: Predators and Scavengers/Ungulates
Moore and McFadden, Chartered — 14978. NEPA: New Alternatives/Issues. Visitor Use: Winter Recreation.
Morgan, Franich, Fredkin, and Marsh — 5989. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Livestock Operations: Public Grazing Allotments — Modify. Visitor Use: Overall Visitor Use and Experience.
Morris, Manning and Martin — 1658. Socioeconomics: Social Values.
Moseley Outdoor Advertising — 7674. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Hunting, Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Mundt and Associates — 760. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
New Jersey Veterans Memorial Home — 2548. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Northfork Ranch — 2530. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Northwest BuildNet, Internet Marketing — 16852. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
NovelTech Inc. — 4764. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution.
Pain Relief Center — 9543. Bison: Population. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Overall Visitor Use and Experience, Winter Recreation.
Patino-Treat and Rosen, Attorneys at Law — 9144. Alternatives: New Alternatives/Issues, Bison Alternative. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Quarantine Operations, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Human Health: Brucellosis Transmission and Public Perception.
Peter H. Dierlich Associates — 3282. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Planetary Productions, Ltd. — 3916. Alternatives: Citizens' Plan.
Purdy Ranches — 10100. Bison: Capture/Test/Slaughter Operations, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.
Quality Transportation Services — 3016. Alternatives: Citizens' Plan. Bison: Hunting. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts.
Rachel Rosenthal Company — 4650. Alternatives: Bison Alternative.
Rancho San Benito — 5791. Bison: Brucellosis Transmission and Public Perception. Objectives

and Constraints: Legal and Policy Mandates — Management Authority.
Raven Trails — 1303. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Population, Quarantine Operations, Vaccination, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: New Alternatives/ Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Nonmarket Values, Reasonable Project Costs. Visitor Use: Winter Recreation.
Richard Raymond Associates — 14688. Alternatives: Alternative Plan B, Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Quarantine Operations, Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs.
River Bend Ranch — 4868. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Rolyboh International, Inc. — 2768. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Ecology. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Social Values.
Russell Lamb Photography — 4495. Bison: Capture/Test/Slaughter Operations, Hunting, Population, Brucellosis Transmission and Public Perception, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use — Winter Recreation.
Santee Cooper — 15870d. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Live), Humane Treatment, Quarantine Operations, Special Management Areas, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts.
Saturday Night and Sunday Morning, Ltd. — 6406. Alternatives: Bison Alternative.
Selah Bamberger Ranch — 4037. Alternatives: Citizens' Plan, Cultural Resources: Archeology/ Cultural Landscapes/Ethnography. Socioeconomics: Social Values.
Silver Cloud Farm — 8110. Bison: Capture/Test/ Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Ecology. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Social Values.
Smith and Doherty, PLLC — 15368. Alternatives: Citizens' Plan. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Snavely Forest Products — 16797. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations.
Snider Hardwoods — 5120. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Spiriti Heart Productions — 15305. Alternatives: Citizens' Plan. Bison: Land Acquisitions/ Easements or Winter Range.
Star B Ranch. See National Bison Association — 15187a.
Star Watcher Productions — 6708. Alternatives: Citizens' Plan. Bison: Land Acquisitions/ Easements or Winter Range.
Stone Orchards — 9392. Bison: Population. Visitor Use: Winter Recreation.
Taylor, John A., Attorney at Law — 11486. Alternatives: New Alternatives/Issues. Bison: Population, Ecology, Brucellosis Risk Management. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience. Wildlife: Threatened and Endangered Species.
TMR Inc. — 17853. Bison: Distribution (Live).
Trout Creek Ranch — 1236. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management

Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.

Upstream Anglers and Outdoor Adventures — 7749. Bison: Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

Van Hyning and Assoc., Inc. — 7484. Bison: Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Wade Gallery — 9858. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination.

Wild Birds Unlimited — 12059. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.

William P. Cook and Associates, PLLC — 1081. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Wisdom House — 1033. Livestock Operations: Cattle Vaccination. Visitor Use: Winter Recreation.

WPKR and WPCK Radio — 887. Bison: Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Yeates, J. William, Attorney at Law — 9702. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Yellowstone Arctic — Yamaha — 14501. Alternatives: New Alternatives/Issues. Bison: Population. Socioeconomics: Nonmarket Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation.

Yellowstone Tour and Travel. See Moore and McFadden, Chartered — 14978

Organization and Educational Institution Comment Letters

Alabama Audubon Council. See Audubon Society, Alabama Council — 9740.

Alabama Cattlemen's Association — 9729. Bison: Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Alabama Cooperative Extension System — 14431. Bison: Capture/Test/Slaughter Operations, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception. Wildlife: Brucellosis in Other Wild Ungulates.

Alabama Environmental Council. See Audubon Society, Alabama Council — 9740.

Alabama Farmers Federation — 9948. Alternatives: New Alternatives/Issues. Bison: Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Human Health: New Alternatives/Issues.

Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740.

Alabama Veterinary Medical Association — 14607. Alternatives: New Alternatives/Issues. Bison: Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Wildlife: Brucellosis in Other Wild Ungulates.

Alliance for the Wild Rockies — 8616. Alternatives: Alternative Plan B. Bison: Definition of Low Risk, Distribution (Live), Hunting, Population, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Wildlife: Brucellosis in Other Wild Ungulates.

American Association of Wildlife Veterinarians — 5638. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Quarantine Operations, Brucellosis in Yellowstone Bison Herd. Livestock Operations: Cattle Vaccination. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates.

American Council of Snowmobile Associations. See "Business Comment Letters" under Moore and McFadden — 14978.

American Farm Bureau Federation — 13356. Bison: Distribution (Live), Population, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception. Human Health: New Alternatives/Issues. Livestock Operations: Cattle — Brucellosis Class-Free Status, Socioeconomics: Benefit and Cost Impacts. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

American Lands Alliance — 3037, 5373. Alternatives: Alternative Plan B, New Alternatives/Issues. Bison: Effects on Free-Ranging Status and Distribution, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify.

American Legion, Miami Beach No.85 — 2690. Alternatives: Citizens' Plan. Bison: Distribution (Live). Objectives and Constraints: Legal and Policy Mandates — Management Authority.

American Reform Party — CA — 4354. Alternatives: Alternative Plan B. Bison: Effects on Free-Ranging Status and Distribution, Population, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators.

American Veterinary Medical Association — 8846. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Population, Quarantine Operations, Vaccination, Brucellosis Testing, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Wildlife: Brucellosis in Other Wild Ungulates.

Animal Advocates of Lake County — 8750. Alternatives: New Alternatives/Issues.

Animal Assistance League of Orange County — 10717. Alternatives: Bison Alternative.

Animal Protection Institute — 11124, 15186a. Bison: Effects on Free-Ranging Status and Distribution, Population, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Animal Rights Alliance. See Schubert & Associates — 10110.

Anti-Vivisection Society of America — 4182. Alternatives: Citizens' Plan. Bison: Distribution (Live).

Appalachian Voices. See Preserve Appalachian Wilderness — 15372.
Apple Country Snowmobile Club — 9255. Alternatives: New Alternatives/Issues. Bison: Population, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Visitor Use: Overall Visitor Use and Experience, Winter Recreation.
Arlington Conservation Council — 7052. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Association of Veterinarians for Animal Rights — 2653. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Winter Recreation
Audubon Society, Alabama Council — 9740. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs, Social Values. Visitor Use: Overall Visitor Use and Experience.
Audubon Society, Bexar — 7059. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Audubon Society, Boulder County — 1476. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Audubon Society, Conococheague — 4105. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Audubon Society, Evergreen Naturalists — 15572. Alternatives: Citizens' Plan, New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations. Livestock Operations: Public Grazing Allotments — Modify. Wildlife: Threatened and Endangered Species
Audubon Society, Last Chance — 8879. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Audubon Society, Montana Chapter — 14568. Alternatives: Citizens' Plan. Bison: Distribution (Live), Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.
Audubon Society, Prairie Wood — 8200. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Audubon Society, Travis — 15082. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations.
Banff Environmental Action and Res. (BEAR) Soc. — 2397a. Bison: Brucellosis Transmission and Public Perception. Wildlife: Threatened and Endangered Species.
Bear Creek Council — 8871. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception, Land Acquisitions/ Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Berlin United Methodist Church — 1625. Alternatives: Citizens' Plan. Bison: Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Big Horn Livestock Association — 14841. Bison: Special Management Areas, Brucellosis Transmission and Public Perception, Land

Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Brucellosis Class-Free Status, Cattle Vaccination.

Billings Rod and Gun Club — 14867. Alternatives: Citizens' Plan. Bison: Hunting. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Blue Ribbon Coalition, Inc. — 7262, 14884 (See also "Business Comment Letters" under Moore and McFadden — 14978). Alternatives: New Alternatives/Issues. Bison: Effects on Free-Ranging Status and Distribution, Hunting, Population, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Benefit and Cost Impacts. Visitor Use: Winter Recreation.

Bridging the Gap — 2116. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Brushy Bottom Bison Basin — 13005. Bison: Brucellosis Transmission and Public Perception.

Buffalo Field Archery Club — 15095. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Special Management Areas. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Buffalo Gap Land Rescue — 14911. Alternatives: Alternative Plan B. Bison: Capture/Test/ Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Buffalo Nations — 14900, 15187. Alternatives: Alternative Plan B. Bison: Capture/Test/ Slaughter Operations, Effects on Free-Ranging Status and Distribution, Quarantine Operations, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates.

Butte Busters Snowmobile Club, Inc. — 9488. Visitor Use: Winter Recreation.

Cabinet Resource Group — 14600. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. NEPA: New Alternatives/Issues. Socioeconomics: Benefit and Cost Impacts Reasonable Project Costs, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

California Farm Bureau Federation — 15806. Bison: Population, Brucellosis Transmission and Public Perception, Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators.

California Federation for Animal Legislation — 336, 4590. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Visitor Use: Winter Recreation.

Chipeta Elementary — 5192. Alternatives: Citizens' Plan. Visitor Use: Overall Visitor Use and Experience. Wildlife: Threatened and Endangered Species.

Civitas — 14226. Bison: Capture/Test/Slaughter Operations, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/ Easements or Winter Range, Vegetation/ Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Clemson University, Department of Livestock Poultry Health Programs — 14336. Bison: Special Management Areas, Brucellosis Transmission and Public Perception.

Cold Mountain, Cold Rivers — 15366. Alternatives: Alternative Plan B, New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Humane Treatment, Population, Quarantine Operations, Special Management

Areas, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Nonmarket Values, Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species,

Colorado Grizzly Project — 2555. Bison: Distribution (Carcasses). Visitor Use: Winter Recreation. Wildlife: Predators and Scavengers/Ungulates.

Colorado State University, Natural Resource Ecology Laboratory — 9308. Bison: Capture/Test/ Slaughter Operations, Population, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing.

Colorado Wildlife Alliance — 6045. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Colorado Wildlife Federation — 9288. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Committee for Children — 420. Bison: Capture/ Test/Slaughter Operations, Hunting, Population, Quarantine Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Committee for Responsible Growth — 6057. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Social Values.

Committee to Abolish the Fur Trade. See Schubert & Associates — 10110.

Concerned People for Animals, Inc. — 1080. Bison: Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Visitor Use: Winter Recreation.

Conservation Council for Hawaii — 5015, 15886. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Converse County School District #2 — 17684. Bison: Land Acquisitions/Easements or Winter Range.

Cornelia Connelly School — 4216. Bison: Capture/ Test/Slaughter Operations, Hunting, Quarantine Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination. Visitor Use: Winter Recreation.

Deerlodge Forest Defense Fund — 13055. Alternatives: Alternative Plan B, Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.

Defenders of Wildlife — 14980. Alternatives: Citizens' Plan. Bison: Definition of Low Risk, Distribution (Live), Hunting, Population, Quarantine Operations, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Consultation and Coordination: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues, Brucellosis Transmission and Public Perception. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators. Wildlife: Threatened and Endangered Species.

Doris Day Animal League — 14383. Alternatives: Bison Alternative. Bison: Hunting, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Socioeconomics: Social Values. Visitor Use: Winter Recreation.

Earth Island Institute — 15214a, 15799 (See also Schubert & Associates — 10110, 14714). Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs, Social Values. Visitor Use: Winter Recreation.

EarthWalk Spiritual Ministry — 16643. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Brucellosis Transmission and Public Perception.

East Ascension Sportsmans League Inc. — 14737. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Testing, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.

Ecology Center — 15150, 15254, 15671. Alternatives: Alternative Plan B, New Alternatives/Issues, Bison Alternative. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Population, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Social Values. Wildlife: Brucellosis — in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

EcoSys Alert — 1287. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Edmonds Institute — 15517. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Hunting, Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Eilat Loves Animals — 192. Bison: Brucellosis Transmission and Public Perception.

Environmental Council of Rhode Island — 16339. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify.

Environmental Protection Information Center — 14337. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Quarantine Operations, Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.

Ethics Outreach — 8664. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Visitor Use: Winter Recreation.

Farm Sanctuary. See Schubert & Associates — 10110.

First Congregational Church — 1298. Bison: Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Flathead Wildlife — 10816. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Florida Biodiversity Project — 9382. Alternatives: New Alternatives/Issues, Bison Alternative. Bison: Distribution (Live), Hunting, Population, Property Damage, Quarantine Operations, Ranching, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock

Operators. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Florida Wildlife Organization — 14915. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Vaccination, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience.

Forest Lake Minnesota Snowmobile Club — 10305. Visitor Use: Winter Recreation.

Frente Zapatista — 14896. Bison: Capture/Test/Slaughter Operations.

Friends of Animals — 419, 5937. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Vaccination, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Friends of Animals and Their Environment and Faith — 15270. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Winter Recreation

Friends of Native Americans — 13545. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution.

Friends of the Bitterroot — 8639. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Vaccination, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Friends of the West — 191. Bison: Population, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Friends of the Wild Swan — 15237. Alternatives: Alternative Plan B, Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Effects on Free-Ranging Status and Distribution, Population, Vaccination, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.

Fund for Animals — 15123, 15124, 15197a (See also Schubert & Associates 10110, 14714. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Quarantine Operations, Vaccination, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Gallatin Wildlife Association — 14935, 15233. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs, Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Georgia Farm Bureau Federation — 14398. Alternatives: New Alternatives/Issues. Bison: Brucellosis in Yellowstone Bison Herd.

Girl Scout Troop 395 — 6831. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter

Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Glasgow Area Chamber of Commerce and Agriculture — 2029. Bison: Capture/Test/ Slaughter Operations, Population, Special Management Areas, Vaccination, Brucellosis Testing, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Wildlife: Threatened and Endangered Species.

Grassland Heritage Foundation — 9158. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Humane Treatment, Property Damage, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Wildlife: Brucellosis in Other Wild Ungulates.

Grassroot for Multiple Use — 14285. Bison: Population. Visitor Use: Winter Recreation.

Great Plains Restoration Council — 5515. Bison: Capture/Test/Slaughter Operations, Hunting, Quarantine Operations. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Visitor Use: Winter Recreation.

Greater Yellowstone Coalition — 14870, 14941, 15126, 15139, 15239, 15420, 15792 (See also Wyoming Stock Growers Association — 15785). Alternatives: Adjustments to Interim Plan, New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Special Management Areas — Proposed Boundaries, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Consultation and Coordination: New Alternatives/Issues, Archeology/Cultural Landscapes/Ethnography. Human Health: Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs, Social Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Harmony Middle School — 6th Grade — 17683. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Brucellosis Testing, Brucellosis Transmission and Public Perception

Heartwood. See Preserve Appalachian Wilderness — 15372.

Honor the Earth — 4490. Bison: Distribution (Live), Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Consultation and Coordination: New Alternatives/Issues. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Humane Education Network — 473, 11441. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Population, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Humane Legislative Network — 6535. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations.

Humane Society, Golden State — 5948. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations.

Humane Society, Marion County — 9678. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Quarantine Operations, Vaccination. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Social Values. Visitor Use: Winter Recreation.

Humane Society, Peoria — 5393. Bison: Brucellosis Transmission and Public Perception.

Humane Society, Seneca County — 9062. Bison: Capture/Test/Slaughter Operations, Hunting, Quarantine Operations. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts. Visitor Use: Winter Recreation.

Humane Society, Tampa Bay — 6881. Bison: Capture/Test/Slaughter Operations, Hunting, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Cattle Vaccination. Socioeconomics: Reasonable Project Costs.

Humane Society of the United States — 10575, 15129. Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Winter Recreation. Wildlife: Threatened and Endangered Species.

Idaho Cattle Association — 11160. Bison: Capture/Test/Slaughter Operations, Population, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Livestock Operations: Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Wildlife: Brucellosis in Other Wild Ungulates.

Idaho Farm Bureau Federation — 11433. Alternatives: New Alternatives/Issues. Bison: Humane Treatment, Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Human Health: Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Socioeconomics: Benefit and Cost Impacts.

Idaho Mythweaver — 14439. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Property Damage, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Wildlife: Brucellosis — in Other Wild Ungulates, Threatened and Endangered Species.

Idaho State Snowmobile Association — 10491. Bison: Hunting, Population. Visitor Use: Winter Recreation.

Idaho Watersheds Project — 15317. Bison: Distribution (Live), Hunting, Population, Property Damage, Quarantine Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Social Values. Visitor Use: Winter Recreation.

Idaho Wildlife Federation of Boise — 14871. Alternatives: Citizens' Plan. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.

In Defense of Animals — 15193a. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Quarantine Operations.

Indiana Wildlife Federation — 5576. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Indigenous Support Coalition of Oregon — 15318. Bison: Capture/Test/Slaughter Operations, Quarantine Operations, Vaccination. Cultural Resources: Archeology/Cultural Landscapes/

Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Inherit the Earth — 1923. Bison: Effects on Free-Ranging Status and Distribution, Humane Treatment, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Social Values.

International Defenders of Animals, Inc. — 6283. Alternatives: Bison Alternative. Bison: Hunting. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

International Lutheran Women's Missionary League — 1113. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Iowa Wildlife Federation, Inc. — 12035. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators.

Izaak Walton League — 15263, 15304. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Hunting, Property Damage, Quarantine Operations, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Jackson Hole Conservation Alliance — 15124a, 15140, 15329 (See also Wyoming Stock Growers Association — 15785). Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Vaccination, Ecology, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts Nonmarket Values, Social Values. Wildlife: Predators and Scavengers/Ungulates, Threatened and Endangered Species

Jerabek Elementary School — 17872. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Testing. Socioeconomics: Social Values.

Kaniksu Bioregional Council — 5168. Bison: Effects on Free-Ranging Status and Distribution, Population, Property Damage, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Kettle Range Conservation Group — 9328, 10524. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Quarantine Operations, Vaccination, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: Bison Effects on Free-Ranging Status and Distribution. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics — Benefit and Cost Impacts, Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates.

Last Chance for Animals. See Schubert & Associates — 10110.

League in Support of Animals — 1780. Bison: Capture/Test/Slaughter Operations.

League of Kentucky Sportsmen, Inc. — 9153. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Social Values.

Lemon Bay High School — 11089. Bison: Capture/Test/Slaughter Operations. Socioeconomics: Social Values.

Little Wound School-3rd Grade — 17682. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations.

Livestock Conservation Institute — 9686. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Population, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or

Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

Louisiana Farm Bureau Federation, Inc. — 14293. Alternatives: New Alternatives/Issues. Bison: Brucellosis in Yellowstone Bison Herd. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators.

Manitoba Animal Alliance — 150. Bison: Capture/Test/Slaughter Operations, Hunting, Population, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Marshall Elementary School — 4th Grade — 17681. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Wildlife: Brucellosis in Other Wild Ungulates.

Maryland Coalition for Animal Rights — 11529. Bison: Capture/Test/Slaughter Operations, Hunting. Livestock Operations: Vaccination. Socioeconomics: Social Values.

Meagher County Sportman Association — 15674. Alternatives: Citizens' Plan. Bison: Hunting. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Mennen Environmental Foundation — 6846. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination

Michigan United Conservation Clubs — 8843. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Population, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Minnesota Conservation Federation — 10495. Alternatives: Citizens' Plan. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Mississippi Wildlife Federation — 10645. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Montana Coalition for Appropriate Management of State Land — 994. Bison: Hunting.

Montana Ecosystems Defense Council — 2820, 9592, 15165. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Quarantine Operations, Special Management Areas, Vaccination, Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Reasonable Project Costs.

Montana Farm Bureau Federation — 14816, 14834, 14836, 15147, 15242. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Humane Treatment, Population, Quarantine Operations, Special Management Areas, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates.

Montana Snowmobile Association. See "Business Comment Letters" under Moore and McFadden, Chartered — 14978.

Montana State University, Extension Range Management — 2919. Bison: Population, Vegetation/Vegetative Communities. Visitor Use: Overall Visitor Use and Experience. Visual Resources: Landscapes and Viewsheds.

Montana Stockgrowers Association — 14832, 14833, 14847, 14853, 14878, 14939, 15160, 15241, 15246, 15349, 15768. Alternatives: Alternative Plan B, New Alternatives/Issues, Bison Alternative, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Population, Quarantine Operations,

Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Human Health: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs. Visual Resources: Landscapes and Viewsheds. Wildlife: Threatened and Endangered Species, Brucellosis in Other Wild Ungulates.

Montana Stockgrowers Cattle Health Comm. — 15747. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Humane Treatment, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.

Montana Wilderness Association — 15257. Alternatives: Citizens' Plan. Bison: Population, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Reasonable Project Costs.

Montana Wildlife Federation — 15234, 15250. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Mt. Shasta Sno-Mobilers, Inc. — 9124, 11058. Bison: Population. Socioeconomics: Nonmarket Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation.

National Bison Association — 9097, 15187a. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Population, Quarantine Operations, Ranching, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

National Cattle and Feed Association — 15130. Bison: Vaccination. Socioeconomics: Social Values.

National Cattlemen's Beef Association — 11138. Bison: Population, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Human Health: New Alternatives/Issues.

National Parks and Conservation Association — 14913, 15196a, 15367. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

National Rifle Association — 2838. Bison: Hunting, Population, Brucellosis Transmission and Public Perception. Socioeconomics: Benefit and Cost Impacts. Wildlife: Predators and Scavengers/Ungulates.

National Rifle Association Coalition — 15211a. Bison: Effects on Free-Ranging Status and Distribution. Socioeconomics: Social Values.

National Wildlife Federation — 14819, 14827, 14846, 14874, 14890, 14923, 15083, 15131, 15142, 15188a, 15245, 15262. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Ranching, Special Management Areas — Proposed Boundaries, Vaccination, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or

Winter Range. Consultation and Coordination: New Alternatives/Issues. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Human Health: New Alternatives/Issues, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Minority and Low-Income Populations, Reasonable Project Costs, Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Native Forest Network — 4102. Alternatives: Alternative Plan B. Bison: Population, Quarantine Operations, Special Management Areas, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Natural Resources Defense Council — 15803. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Brucellosis in Other Wild Ungulates, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs.

New Jersey Animal Rights Alliance — 11137 (See also Schubert & Associates — 10110). Alternatives: Bison Alternative. Bison: Capture/Test/Slaughter Operations, Hunting, Quarantine Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Socioeconomics: Benefit and Cost Impacts, Reasonable Project Costs. Visitor Use: Winter Recreation.

New Jersey Environmental Lobby — 1739. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

North American Bison Society — 1754. Alternatives: Citizens' Plan. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

North American Independent Indigenous Community — 13131. Socioeconomics: Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

North Central Ohio Nature Preservation League — 281, 619, 3288. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Vaccination, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

North Coast Environmental Center — 15326. Alternatives: Alternative Plan B.

North Fork Preservation Association — 8383. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Ecology. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators.

Northern Rockies Preservation Project — 5064. Alternatives: Alternative Plan B. Bison: Population, Quarantine Operations, Special Management Areas, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Wildlife: Brucellosis in Other Wild Ungulates,

Northwest Indiana Association of Wholistic Healers — 3535. Livestock Operations: Public Grazing Allotments — Modify.

Ohio Environmental Council — 446, 2697. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Winter Recreation.

Orange County People for Animals — 3836. Bison: Capture/Test/Slaughter Operations.

Oregon Cattlemen's Association — 15669. Alternatives: New Alternatives/Issues. Bison:

Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status.

Oregon Dairy Farmers Association — 15850. Alternatives: New Alternatives/Issues. Bison: Population, Brucellosis Transmission and Public Perception.

Oregon Natural Resources Council — 2775. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Park County Ranchers Marketing Assoc. — 15183. Alternatives: New Alternatives/Issues. Bison: Vaccination, Brucellosis Transmission and Public Perception. Socioeconomics: Cost to Livestock Operators.

People for the USA — 10316, 13483. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Brucellosis in Yellowstone Bison Herd. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Overall Visitor Use and Experience.

Portneuf Environmental Council — 13111. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception, Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators.

Predator Education Fund — 14894. Alternatives: Alternative Plan B. Bison: Effects on Free-Ranging Status and Distribution, Ecology, Brucellosis Transmission and Public Perception.

Predator Project — 15332. Alternatives: Alternative Plan B, Bison Alternative, Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Population, Vaccination, Bison Ecology, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Preserve Appalachian Wilderness — 9058, 15372. Alternatives: Alternative Plan B, New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Property Damage, Quarantine Operations, Vaccination, Ecology, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates.

Republicans for Environmental Protection — 14892. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Reasonable Project Costs.

Respect for Life Society — 188. Bison: Hunting, Population, Brucellosis Transmission and Public Perception.

Rock Springs 4-H Center — 9656. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Brucellosis Testing. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Rocky Mountain Animal Defenders. See Schubert & Associates — 10110.

Rocky Mountain Animal Defense — 14700, 14920, 14921. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Vaccination, Bison Alternative, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Reasonable

Project Costs, Social Values. Visitor Use: Winter Recreation. Visual Resources: Landscapes and Viewsheds. Wildlife: Brucellosis in Other Wild Ungulates.

S.K.U.N.K.S — 16751. Bison: Capture/Test/Slaughter Operations, Distribution (Live). Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sacred Earth Network — 9359. Bison: Capture/Test/Slaughter Operations, Quarantine Operations, Vaccination. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify.

Safari Club International — 8810. Bison: Hunting, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities.

Sarasota in Defense of Animals — 11060. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Social Values. Visitor Use: Winter Recreation.

Save Our Earth — 6963. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution.

Schubert & Associates — 10110, 14714. Alternatives: New Alternatives/Issues, Bison Alternative. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Quarantine Operations, Vaccination, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Consultation and Coordination: New Alternatives/Issues. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Human Health: Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Seeley Lake Driftriders — 8638. Bison: Population. Visitor Use: Winter Recreation.

SEIEN (Southeast Idaho Environmental Network) — 1211. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Hunting, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Seventh Generation Fund — 15565. Bison: Capture/Test/Slaughter Operations, Hunting, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs.

Sierra Club — 10603, 15804. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Sierra Club, Berks Group — 297. Bison: Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Sierra Club, Big River Group — 8850. Bison: Capture/Test/Slaughter Operations, Population, Special Management Areas. Livestock Operations: Cattle Vaccination.

Sierra Club, Bitterroot Mission Group — 13447. Bison: Effects on Free-Ranging Status and Distribution, Humane Treatment, Population, Property Damage, Quarantine Operations, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience. Wildlife: Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Sierra Club, Black Hills Group — 15199. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Population, Ranching, Vaccination, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Sierra Club, Central Florida Group — 3659. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Population, Property Damage, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Columbia Group, Oregon Chapter — 11424. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Population, Property Damage, Quarantine Operations. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Delta Group of San Francisco — 11018. Bison: Effects on Free-Ranging Status and Distribution, Humane Treatment, Property Damage, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, East Idaho Group — 14877. Bison: Effects on Free-Ranging Status and Distribution, Population, Property Damage, Ecology, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Threatened and Endangered Species

Sierra Club, Montana Chapter — 15172 (See also Sierra Club, Yellowstone Ecosystem Task Force — 15890). Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Property Damage, Ecology, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Property Damage, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Mount Evans Group — 10156. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.

Sierra Club, Northern Rockies. See Sierra Club, Yellowstone Ecosystem Task Force — 15890.

Sierra Club, North Star Chapter — 15843. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Vaccination, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Sierra Club, Placer Group — 9825. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Rocky Mountain Chapter — 15726. Bison: Effects on Free-Ranging Status and Distribution, Population, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Santa Lucia Chapter — 5432. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates.

Sierra Club, Texas Lone Star Chapter — 15094. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Sierra Club, Upper Columbia River — 13036. Alternatives: Alternative Plan B.

Sierra Club, Wyoming Chapter — 15130, (See also Sierra Club, Yellowstone Ecosystem Task Force — 15890). Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Property Damage, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs.

Sierra Club, Yellowstone Ecosystem Task Force — 15890. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

Sinapu — 14540, 14928. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Quarantine Operations, Vaccination, Ecology, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Threatened and Endangered Species.

Skyline Sportsmen's Association, Inc. — 639. Bison: Population, Vaccination, Vegetation/Vegetative Communities.

Society for Range Management — 15723. Bison: Population, Ecology, Vegetation/Vegetative Communities.

South Carolina Wildlife Federation — 9668. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Southeast Montana Sportsman Association — 14855, 14861. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts.

Southeastern Livestock Association — 14848. Bison: Population, Brucellosis in Yellowstone Bison Herd. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators.

SPCA, Animal Care and Welfare — 256. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Quarantine Operations, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Visitor Use: Winter Recreation.

SPCA, League for Animal Protection, Inc. — 2549. Bison: Capture/Test/Slaughter Operations, Humane Treatment, Hunting, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination.

SPEAK — 10071. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception.

St. Labre — 13330. Bison: Effects on Free-Ranging Status and Distribution. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values.

St. Labre Volunteers — 11096. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Quarantine Operations, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Reasonable Project Costs.

Station Middle School — 5187. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Humane Treatment, Quarantine Operations, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Social Values.

Stuyvesant High School, American Habitat Club — 8592. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Hunting, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Socioeconomics: Social Values.

Sun City Friends of Animals, Inc. — 7846, 8715a. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Humane Treatment, Bison Alternative, Brucellosis Transmission and Public Perception.

Teen Animal Protectors — 16576. Bison: Capture/Test/Slaughter Operations.

Texas and Southwestern Cattle Raisers Association — 14338. Bison: Capture/Test/Slaughter Operations, Population, Special Management Areas.

Texas Animals — 15074. Bison: Vaccination. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Texas Committee on Natural Resources — 15081. Bison: Capture/Test/Slaughter Operations. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Texas Establishment for Animal Rights. See Schubert & Associates — 10110.

Trimbelle Rod and Gun Club — 10109. Alternatives: Citizens' Plan. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Trout Unlimited, Rio Grande Chapter — 9369. Alternatives: Citizens' Plan. Bison: Effects on Free-Ranging Status and Distribution, Quarantine Operations, Ecology, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Social Values. Wildlife: Predators and Scavengers/Ungulates, Threatened and Endangered Species.

Turner Foundation Inc. — 11514. Bison: Capture/Test/Slaughter Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Minority and Low-Income Populations, Social Values. Wildlife: Threatened and Endangered Species.

Union Furnace Elementary School, 3rd Grade — 17685. Bison: Capture/Test/Slaughter Operations.

United States Animal Health Association — 9364. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Hunting, Population, Quarantine Operations, Special Management Areas, Special Management Areas — Proposed Boundaries, Vaccination, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Human Health: Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Social Values. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

University of California, Cooperative Extension — 9122. Bison: Capture/Test/Slaughter Operations, Special Management Areas, Brucellosis in Yellowstone Bison Herd. Human Health: Brucellosis Transmission and Public Perception.

Utah Farm Bureau Federation — 15780. Bison: Population, Special Management Areas, Brucellosis Transmission and Public Perception. Human Health: Brucellosis Transmission and Public Perception. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values. Wildlife: Predators and Scavengers/Ungulates.

Utah Snowmobile Association — 9050. Bison: Population. Socioeconomics: Nonmarket Values. Visitor Use: Winter Recreation. Visual Resources: Landscapes and Viewsheds.
Utah Wildlife Federation — 9301. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Quarantine Operations, Vaccination, Land Acquisitions/ Easements or Winter Range, Vegetation/ Vegetative Communities. Consultation and Coordination: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Visitor Use: Winter Recreation.
Valley Middle School — 5191. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Humane Treatment. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Valley Snodrifters — 14277. Bison: Population. Visitor Use: Winter Recreation.
Virginia 10th District Environmental Council — 11398. Alternatives: Alternative Plan B, Citizens' Plan. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Reasonable Project Costs.
Virginia Wildlife Federation — 1946. Alternatives: Citizens' Plan. Bison: Distribution (Live), Quarantine Operations, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Reasonable Project Costs, Social Values. Visitor Use: Overall Visitor Use and Experience.
Voice for Wildlife — 11490. Bison: Capture/Test/ Slaughter Operations, Brucellosis Transmission and Public Perception, Brucellosis Risk Management.
Washington Cattlemen's Association — 14312. Alternatives: New Alternatives/Issues. Bison: Special Management Areas, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Washington Elementary School — 6th Grade — 17680. Bison: Capture/Test/Slaughter Operations. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Washington State Snowmobile Association — 13452. Bison: Vegetation/Vegetative Communities. Visitor Use: Winter Recreation.
Washington Wildlife Federation — 4538, 16709. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.
West Yellowstone Chamber of Commerce. See "Business Comment Letters" under Moore and McFadden, Chartered — 14978.
Western Wildlife Health Cooperative — 4433. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Quarantine Operations, Special Management Areas, Vaccination. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.
Wild Rockies InfoNet — 15545. Alternatives: Alternative Plan B, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Quarantine Operations, Special Management Areas, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/ Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Reasonable Project Costs. Visual Resources: Landscapes and Viewsheds. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.
Wilderness Society — 14909, 14979, 15209a. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing

Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Wildlands Center for Preventing Roads — 15354. Alternatives: Alternative Plan B. Bison: Capture/Test/Slaughter Operations, Hunting, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Socioeconomics: Reasonable Project Costs, Social Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation.

Wildlife Damage Review — 7555. Alternatives: Bison Alternative. Bison: Effects on Free-Ranging Status and Distribution, Brucellosis Transmission and Public Perception, Livestock Operations: Public Grazing Allotments — Modify. Socioeconomics: Social Values. Visitor Use: Winter Recreation.

Wildlife Management Institute — 5455. Bison: Hunting, Population, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Public Grazing Allotments. Objectives and Constraints: New Alternatives/ Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators. Visitor Use: Overall Visitor Use and Experience. Wildlife: Brucellosis in Other Wild Ungulates.

Wildlife Rehabilitation and Refuge Center — 374. Bison: Capture/Test/Slaughter Operations, Hunting, Population, Quarantine Operations, Vaccination, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Wildlife Society — 14309. Bison: Distribution (Live), Hunting, Population, Quarantine Operations, Special Management Areas. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.

World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110.

Wyoming Farm Bureau Federation — 14642, 14889. Alternatives: New Alternatives/Issues. Bison: Population, Quarantine Operations, Ranching, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators. Wildlife: Brucellosis in Other Wild Ungulates, Threatened and Endangered Species.

Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785.

Wyoming Stock Growers Assoc. — 14826, 14854, 15122, 15128, 15215, 15785. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Reasonable Project Costs. Visitor Use: Overall Visitor Use and Experience. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates.

Wyoming Wildlife Federation — 14397, 14825, 14875, 14918, 15127 (See also Wyoming Stock Growers Association — 15785). Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Reasonable Project Costs, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Yell County Wildlife Federation — 2521, 7319.
Alternatives: Citizens' Plan. Bison: Humane Treatment, Hunting, Ecology, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify. NEPA: New Alternatives/Issues, Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience. Wildlife: Brucellosis in Other Wild Ungulates.

Public Agency Comment Letters

Federal Agencies

Environmental Protection Agency — 14356. Alternatives: Citizens' Plan. Bison: Definition of Low Risk, Special Management Areas — Authority to Manage, Brucellosis Transmission and Public Perception. Consultation and Coordination: New Alternatives/Issues, Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Minority and Low-Income Populations. Wildlife: Brucellosis in Other Wild Ungulates.

Federal Elected Officials

United States Senate, South Dakota — 17861. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

State Agencies

Alabama Department of Agriculture and Industries — 9839. Bison: Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. NEPA: New Alternatives/ Issues.

Arizona Department of Agriculture — 12033. Bison: Brucellosis in Yellowstone Bison Herd, Brucellosis Risk Management. Human Health: New Alternatives/Issues. Socioeconomics: Cost to Livestock Operators.

California Department of Food and Agriculture — 9243. Alternatives: New Alternatives/Issues. Bison: Distribution (Live), Quarantine Operations, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Human Health: Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values. Wildlife: Brucellosis in Other Wild Ungulates.

Georgia Department of Agriculture — 9000, 9229, 11108. Bison: Population, Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Objectives and Constraints: New Alternatives/Issues. Socioeconomics: Social Values.

Illinois Department of Agriculture — 9446. Alternatives: New Alternatives/Issues. Bison: Special Management Areas, Brucellosis Transmission and Public Perception. Human Health: Brucellosis Transmission and Public Perception. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators.

Indiana State Board of Animal Health — 9361. Bison: Special Management Areas. Livestock Operations: Cattle — Brucellosis Class-Free Status.

Kansas Animal Health Department, Livestock Commission — 8455. Bison: Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Human Health: New Alternatives/Issues, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators. Wildlife: Brucellosis in Other Wild Ungulates.

Louisiana Department of Agriculture and Forestry — 9020. Bison: Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. Socioeconomics: Cost to Livestock Operators.

Michigan Department of Agriculture — 10509. Alternatives: Alternative Plan B, Bison Alternative. Socioeconomics: Reasonable Project Costs.

Minnesota Board of Animal Health — 8993. Bison: Special Management Areas, Brucellosis Transmission and Public Perception. Human Health: Brucellosis Transmission and Public Perception. Socioeconomics: Cost to Livestock Operators.

Nevada Department of Business and Industry, Division of Agriculture — 7526. Bison: Brucellosis in Yellowstone Bison Herd. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

North Carolina Department of Agriculture and Consumer Services — 8791. Bison: Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception.

North Dakota Department of Agriculture, Board of Animal Health — 8440. Bison: Effects on Free-Ranging Status and Distribution, Population, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status.

Oregon Department of Agriculture — 14362. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Special Management Areas. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

South Dakota Animal Industry Board — 9102. Bison and Human Health: Brucellosis Transmission and Public Perception.

Texas Animal Health Commission — 9317. Bison: Population, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status.

Utah Department of Agriculture and Food — 14887, 15781. Bison: Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify.

Vermont Department of Agriculture, Food and Markets — 7485. Bison: Definition of Low Risk, Brucellosis in Yellowstone Bison Herd. Human Health: Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Wildlife: Brucellosis in Other Wild Ungulates.

Washington Department of Agriculture — 10399. Bison: Special Management Areas, Brucellosis Transmission and Public Perception. Livestock Operations: Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators.

Wisconsin Department of Agriculture, Trade and Consumer Protection — 11531. Bison: Special Management Areas, Vaccination, Brucellosis in Yellowstone Bison Herd. Human Health: Brucellosis Transmission and Public Perception.

Wyoming Division of Cultural Resources — 8778. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography.

Wyoming Game and Fish Department — 9268. Bison: Hunting, Population, Special Management Areas, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Livestock Operations: Public Grazing Allotments — Modify.

Wyoming Livestock Board — 14820. Bison: Definition of Low Risk, Population, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Socioeconomics: Reasonable Project Costs. Wildlife: Brucellosis in Other Wild Ungulates.

State Elected Officials

Idaho State Governor — 11121. Bison: Definition of Low Risk, Hunting, Population, Special Management Areas, Ecology, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Human Health: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Nonmarket Values, Reasonable Project Costs, Social Values. Visitor Use: Winter Recreation. Wildlife: Threatened and Endangered Species.

Montana House of Representatives — 8872, 14851, 14857, 15668. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Population, Vaccination, Brucellosis Testing, Brucellosis Transmission and Public Perception, Vegetation/Vegetative Communities. Human Health: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Montana State Senate — 940, 14843, 15316. Alternatives: Adjustments to Interim Plan, Alternative Plan B, Alternatives/Issues Eliminated from Further Consideration, New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Vaccination, Ecology, Brucellosis in

Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Vegetation /Vegetative Communities. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Nonmarket Values, Social Values. Visitor Use: Winter Recreation. Visual Resources: Landscapes and Viewsheds. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates.

Wyoming State Governor — 14448. Alternatives: New Alternatives/Issues. Bison: Population, Vaccination, Brucellosis Risk Management. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

County and Local Governments and Agencies

California, County of Sacramento — 10336. Alternatives: Citizens' Plan. Bison: Capture/ Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Land Acquisitions/ Easements or Winter Range. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values. Visitor Use: Overall Visitor Use and Experience.

Cody Conservation District Board — 14829. Bison: Population. Cultural Resources: Archeology/ Cultural Landscapes/Ethnography, Vegetation/ Vegetative Communities. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators. Visual Resources: Landscapes and Viewsheds.

Town of West Yellowstone, Montana. See "Business Comment Letters" under Moore and McFadden, Chartered — 14978.

Tribal Government and Tribal Organization Comment Letters

American Indian Movement — 15261, 15297. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations. Cultural Resources — Archeology/Cultural Landscapes/ Ethnography.

Assiniboine Tribe — 14844, 14850, 17708, 17723, 17724, 17725, 17726, 17727, 17728, 17729, 17730, 17731. Alternatives: New Alternatives/ Issues, Citizens' Plan. Bison: Capture/Test/ Slaughter Operations, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Humane Treatment, Hunting, Population, Quarantine Operations, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Cost to Livestock Operators, Minority and Low-Income Populations, Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates, Predators and Scavengers/Ungulates.

Cheyenne River Sioux Tribe — 15079, 15133a, 17720, 17751, 17752, 17753, 17754, 17755, 17756, 17758, 17759. Alternatives: Adjustments to Interim Plan, Alternatives/Issues Eliminated from Further Consideration, New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Quarantine Operations, Vaccination, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Testing, Brucellosis Transmission and Public Perception. Cultural Resources — Archeology/Cultural Landscapes/Ethnography. Human Health: Cultural Resources. Livestock Operations: Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Minority and Low-Income Populations, Nonmarket Values, Social Values. Visitor Use: Overall Visitor Use and Experience, Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Chippewa Cree Indians — 14837. Bison: Capture/ Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution, Population, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Wildlife: Brucellosis in Other Wild Ungulates.

Colville Confederated Tribes — 6990. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Hunting, Population, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.

Commanche Caddo — 15112. Bison: Capture/Test/ Slaughter Operations, Distribution (Carcasses), Humane Treatment. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Socioeconomics: Cost to Livestock Operators.

Confederated Salish and Kootenai Tribes of the Flathead Nation — 9371, 17715, 17735, 17736, 17737, 17738, 17739. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Distribution (Carcasses), Distribution (Live), Hunting, Quarantine Operations, Brucellosis Transmission and Public Perception, Land Acquisitions/Easements or Winter Range. Consultation and Coordination: Archeology/ Cultural Resources/Ethnography. Livestock Operations: Public Grazing Allotments — Modify. Cultural Resources: Archeology/ Cultural Landscapes/Ethnography. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Nonmarket Values, Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Confederated Tribes of the Yakama Indian Nation — 11029. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special

Management Areas, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Crow Tribe — 17711, 17716. Bison: Capture/Test/ Slaughter Operations, Distribution (Live). Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.
Flandreau Santee Sioux Tribe — 194. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations, Distribution (Carcasses), Distribution (Live), Hunting, Population Quarantine Operations, Special Management Areas, Brucellosis Testing, Brucellosis Transmission and Public Perception. Livestock Operations: Public Grazing Allotments — Modify. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.
Fort Belknap Community Council — 15745. Alternatives: New Alternatives/Issues.
Fort Belknap Tribal Council — 17734. Socioeconomics: Benefit and Cost Impacts, Minority and Low-Income Populations.
Gros Ventre Tribe — 17732, 17733. Alternatives: New Alternatives/Issues. Bison: Capture/Test/ Slaughter Operations, Distribution (Live), Quarantine Operations, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/ Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority.
Ho-Chunk Nation — 17717. Bison: Quarantine Operations. Cultural Resources: Archeology/ Cultural Landscapes/Ethnography. Socioeconomics: Social Values.
Indian Counseling Center — 9757. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Indian Summer Festivals Inc. — 9877. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.
InterTribal Bison Cooperative — 14484, 14838, 15189a, 15240, 15271, 15290, 17712, 17714. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Definition of Low Risk, Distribution (Carcasses), Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Property Damage, Quarantine Operations, Special Management Areas, Special Management Areas — Proposed Boundaries, Vaccination, Brucellosis Testing, Brucellosis Risk Management. Consultation and Coordination: New Alternatives/Issues. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Visitor Use: Winter Recreation.
Lower Brule Community College — 11453, 12050. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Lower Brule Sioux Tribe — 9107, 9108. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Vaccination, Land Acquisitions/ Easements or Winter Range. Livestock Operations: Cattle Vaccination.
Lower Sioux Indian Community — 15811. Alternatives: Citizens' Plan. Cultural Resources — Archeology/Cultural Landscapes/ Ethnography.
Minnesota Chippewa Tribe — 10349. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Social Values.
Minnesota State, Indian Affairs Council — 10031. Alternatives: Citizens' Plan. Bison: Distribution (Live), Effects on Free-Ranging Status and Distribution, Population, Special Management Areas, Land Acquisitions/Easements or Winter

Range. Livestock Operations: Cattle Vaccination.

Montana Tribal Fish and Wildlife Commission — 15363. Alternatives: Citizens' Plan. Bison: Distribution (Carcasses), Distribution (Live), Hunting, Population, Quarantine Operations, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Cost to Livestock Operators, Minority and Low-Income Populations, Social Values. Visitor Use: Winter Recreation. Wildlife: Brucellosis in Other Wild Ungulates.

Nez Perce Tribal Executive Committee — 11409a. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Carcasses), Distribution (Live), Population, Quarantine Operations, Special Management Areas, Vaccination, Brucellosis Testing, Brucellosis Transmission and Public Perception, Brucellosis Risk Management, Land Acquisitions/Easements or Winter Range. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Human Health: Cultural Resources. Livestock Operations: Public Grazing Allotments — Modify, Cattle — Brucellosis Class-Free Status, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: New Alternatives/Issues, Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Minority and Low-Income Populations. Visitor Use: Winter Recreation. Visual Resources: Landscapes and Viewsheds. Wildlife: Brucellosis in Other Wild Ungulates.

Northern Arapaho Tribe — 17722. Bison: Distribution (Live).

Northern Cheyenne Tribe — 14839, 14852, 15667. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Ranching. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Oglala Lakota College — 14408, 15384. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Hunting, Population, Quarantine Operations, Special Management Areas, Ecology, Land Acquisitions/Easements or Winter Range, Vegetation/Vegetative Communities. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Social Values.

Oglala Sioux Tribe — 4018, 15258, 17757. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Ecology, Brucellosis Transmission and Public Perception. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Minority and Low-Income Populations.

Prairie Band of Potawatomi Nation — 17710. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Nonmarket Values.

Prairie Island Tribal Council — 15812. Alternatives: Citizens' Plan. Bison: Distribution (Live), Population, Special Management Areas, Land Acquisitions/Easements or Winter Range. Livestock Operations: Cattle Vaccination. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Pueblo of Pojoaque — 5730. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Effects on Free-Ranging Status and Distribution, Quarantine Operations, Brucellosis Transmission and Public Perception.

Rosebud Sioux Tribe — 17721. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Saginaw Chippewa Tribe — 15090. Cultural Resources: Archeology/Cultural Landscapes/Ethnography.

Shakopee Mdewakanton Sioux Community — 8827. Alternatives: Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Effects on Free-Ranging Status and Distribution. Livestock Operations: Cattle — Brucellosis Class-Free Status.

Shoshone-Bannock Tribes — 14775, 17740, 17741, 17742, 17743, 17744, 17745, 17746, 17747, 17748, 17749, 17750. Alternatives: New Alternatives/Issues. Bison: Capture/Test/Slaughter Operations, Distribution (Carcasses), Effects on Free-Ranging Status and Distribution, Hunting, Population, Special Management Areas — Authority to Manage, Ecology, Brucellosis in Yellowstone Bison Herd, Brucellosis Transmission and Public Perception, Brucellosis Risk Management. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Livestock Operations: Public Grazing Allotments — Modify, Cattle Vaccination. NEPA: New Alternatives/Issues. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Benefit and Cost Impacts, Minority and Low-Income Populations, Social Values.

Sisseton Wahpeton Sioux Tribe — 17713. Alternatives: Alternatives/Issues Eliminated from Further Consideration. Bison: Capture/Test/Slaughter Operations, Quarantine Operations. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

Thunder Nation — 15280. Bison: Capture/Test/Slaughter Operations. Socioeconomics: Social Values.

United Sioux Tribes — 17719. Alternatives: New Alternatives/Issues. Bison: Brucellosis Transmission and Public Perception. Objectives and Constraints: Legal and Policy Mandates — Management Authority.

United Tribes Technical College — 14455. Alternatives: New Alternatives/Issues, Citizens' Plan.

Upper Sioux Community — 14701. Alternatives: Adjustments to Interim Plan. Bison: Brucellosis Transmission and Public Perception. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography.

Winnebago Tribe of Nebraska — 14563, 17709. Alternatives: New Alternatives/Issues, Citizens' Plan. Bison: Capture/Test/Slaughter Operations, Distribution (Live), Quarantine Operations, Cultural Resources: Archeology/Cultural Landscapes/Ethnography. Objectives and Constraints: Legal and Policy Mandates — Management Authority. Socioeconomics: Minority and Low-Income Populations, Social Values. Wildlife: Brucellosis in Other Wild Ungulates.

Yankton Sioux Tribe — 15846, 17718. Alternatives — Adjustments to Interim Plan. Bison: Brucellosis Transmission and Public Perception. Consultation and Coordination: Archeology/Cultural Resources/Ethnography. Cultural Resources: Archeology/Cultural Landscapes/Ethnography. NEPA: New Alternatives/Issues. Socioeconomics: Social Values.

Index of Commenters by Topic

Alternatives

Adjustments to Interim Plan (AL-2)
- Cheyenne River Sioux Tribe — 17759
- Greater Yellowstone Coalition — 15420
- Upper Sioux Community — 14701
- Yankton Sioux Tribe — 15846

Alternative Plan B (AL-54)
- Alliance for the Wild Rockies — 8616
- American Lands Alliance — 5373
- American Reform Party — CA — 4354
- Appalachian Voices. See Preserve Appalachian Wilderness — 15372
- Blue Water Publishing, Inc. — 10530
- Buffalo Gap Land Rescue — 14911
- Buffalo Nations — 15187
- Cold Mountain, Cold Rivers — 15366
- Deerlodge Forest Defense Fund — 13055
- Ecology Center — 15150, 15254, 15671
- Edmonds Institute — 15517
- Environmental Protection Information Center — 14337
- Friends of the Wild Swan — 15237
- Heartwood. See Preserve Appalachian Wilderness — 15372
- In Defense of Animals — 15193a
- LaCrosse Associates — 13033a
- Michigan Department of Agriculture — 10509
- Montana Ecosystems Defense Council — 15165, 9592
- Montana State Senate — 15316
- Montana Stockgrowers Association — 14939
- Native Forest Network — 4102
- North Coast Environmental Center — 15326
- Northern Rockies Preservation Project — 5064
- Predator Education Fund — 14894
- Predator Project — 15332
- Preserve Appalachian Wilderness — 15372, 9058
- Republicans for Environmental Protection — 14892
- Richard Raymond Associates — 14688
- Sierra Club, Upper Columbia River — 13036
- Virginia 10th District Environmental Council — 11398
- Wild Rockies InfoNet — 15545
- Wildlands Center for Preventing Roads — 15354

Alternatives/Issues Eliminated from Further Consideration (AL-3)
- Cheyenne River Sioux Tribe — 17751, 17755, 17758
- Montana State Senate — 15316
- Sisseton Wahpeton Sioux Tribe — 17713

New Alternatives/Issues (AL-4)
- Alabama Farmers Federation — 9948
- Alabama Veterinary Medical Association — 14607
- American Indian Movement — 15261
- American Lands Alliance — 3037
- Animal Advocates of Lake County — 8750
- Animal Rights Alliance. See Schubert & Associates — 10110
- Appalachian Voices. See Preserve Appalachian Wilderness — 15372
- Apple Country Snowmobile Club — 9255
- Assiniboine Tribe — 14844, 17725, 17727, 17728, 17729, 17730
- Audubon Society, Evergreen Naturalists — 15572
- Blue Ribbon Coalition, Inc. — 7262
- Bracer Consulting — 13417
- Bruce Jackson Photography — 3795
- California Dept of Food and Agriculture — 9243
- California Federation for Animal Legislation — 4590
- Cheyenne River Sioux Tribe — 17751, 17754, 17758, 17759
- Cold Mountain, Cold Rivers — 15366
- Colville Confederated Tribes — 6990
- Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
- Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735
- Ecology Center — 15671
- Ethics Outreach — 8664
- Farm Sanctuary. See Schubert & Associates — 10110
- Flandreau Santee Sioux Tribe — 194
- Florida Biodiversity Project — 9382
- Fort Belknap Community Council — 15745
- Georgia Farm Bureau Federation — 14398
- Greater Yellowstone Coalition — 15420
- Gros Ventre Tribe — 17732, 17733
- Hagenbarth Livestock — 10638
- Hakansson, Carl G., Attorney at Law — 1905
- Heartwood. See Preserve Appalachian Wilderness — 15372
- Humane Legislative Network — 6535
- Humane Society, Golden State — 5948
- Idaho Farm Bureau Federation — 11433

Illinois Department of Agriculture — 9446
Indigo Girls — 14205
InterTribal Bison Cooperative — 17714
Kettle Range Conservation Group — 9328
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Louisiana Farm Bureau Federation, Inc. — 14293
Montana Farm Bureau Federation — 14816
Montana House of Representatives — 8872
Montana State Senate — 15316
Montana Stockgrowers Association — 15349
National Bison Association — 9097
National Wildlife Federation — 14819, 15142
Nez Perce Tribal Executive Committee — 11409a
Oglala Sioux Tribe — 15258, 17757
Oregon Cattlemen's Association — 15669
Oregon Dairy Farmers Association — 15850
Oregon Department of Agriculture — 14362
Park County Ranchers Marketing Associates — 15183
Patino-Treat and Rosen, Attorneys at Law — 9144
Preserve Appalachian Wilderness — 15372
Schubert & Associates — 10110, 14714
Shoshone-Bannock Tribes — 17743, 17746, 17747, 17748
Sierra Club, North Star Chapter — 15843
Star B Ranch. See National Bison Association — 15187a
Station Middle School — 5187
Stuyvesant High School, American Habitat Club — 8592
Taylor, John A., Attorney at Law — 11486
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United Sioux Tribes — 17719
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
United Tribes Technical College — 14455
Washington Cattlemen's Association — 14312
Winnebago Tribe of Nebraska — 14563, 17709
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642
Wyoming State Governor — 14448
Yellowstone Arctic — Yamaha — 14501

Bison Alternative (AL-55)

Animal Assistance League of Orange County — 10717
Animal Rights Alliance. See Schubert & Associates — 10110
Blaise Hayward Studio — 9413
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Don Devine's Studio — 7731
Doris Day Animal League — 14383
Earth Island Institute — 15799
Ecology Center — 15671
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Fund for Animals — 15123, 15124, 15197a
Humane Education Network — 11441
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
International Defenders of Animals, Inc. — 6283
Kelly, Hart and Hallman — 8158
Last Chance for Animals. See Schubert & Associates — 10110
Michigan Department of Agriculture — 10509
Montana Stockgrowers Association — 14939
New Jersey Animal Rights Alliance — 11137
Patino-Treat and Rosen, Attorneys at Law — 9144
Predator Project — 15332
Rachel Rosenthal Company — 4650
Rocky Mountain Animal Defense — 14700, 14920, 14921
Saturday Night and Sunday Morning, Ltd. — 6406
Schubert & Associates — 10110, 14714
Sun City Friends of Animals, Inc. — 8715a
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Wildlife Damage Review — 7555
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110

Citizens' Plan (AL-53)

Abrahams, Loewenstein, Bushman and Kauffman — 3910
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
All Aboard Travel — 7561
Alpine Environmental, Inc. — 9079
American Legion, Miami Beach No.85 — 2690
Andersons Arsenal — 2563
Anti-Vivisection Society of America — 4182
Arlington Conservation Council — 7052
Aspen Trading Post — 11902

Assiniboine Tribe — 14844
Audio Press — 14438
Audubon Society, Alabama Council — 9740
Audubon Society, Montana Chapter — 14568
Audubon Society, Boulder County — 1476
Audubon Society, Conococheague — 4105
Audubon Society, Evergreen Naturalists — 15572
Audubon Society, Last Chance — 8879
Audubon Society, Travis — 15082
Backyard Designs — 1434
Baker Animal Hospital — 8926
Bear Creek Council — 8871
Berlin United Methodist Church — 1625
Billings Rod and Gun Club — 14867
Boesche, McDermott and Eskridge — 6201
Bridging the Gap — 2116
C. W. Roders Enterprises — 3022
California, County of Sacramento — 10336
Calvary Cemetery — 8066
Cambata Aviation Inc. — 6015
Cefali and Cefali Attorneys at Law — 1690
Cheyenne River Sioux Tribe — 15133a, 17720
Chipeta Elementary — 5192
City Living Realtors — 7858
Coffee Shaman — 794
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Responsible Growth — 6057
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17739
Confederated Tribes of the Yakama Indian Nation — 11029
Conservation Council for Hawaii — 15886
Coyote Creek Photography — 1786
D. Lindsay Pettus Real Estate — 7034
Daniel C. Hughes, Jr., Investment Properties — 10240
David L. Bourgoin Law Offices — 4104
David Spagat, Ltd. — 8011
Dawson Medical Group — 4408
Defenders of Wildlife — 14980
Diamond K Outfitters, Inc. — 10722
Direct Response — 3822
Double Spear Ranch — 9063
East Ascension Sportsmans League Inc. — 14737
EB3 Ranch — 1722
EcoSys Alert — 1287
Environmental Council of Rhode Island — 16339
Environmental Protection Agency — 14356
Family Medicine — 7755
Flathead Wildlife — 10816
Florida Wildlife Organization — 14915
Friends of Native Americans — 13545
Gallatin Wildlife Association — 14935, 15233
Georgia Surgical Associates, P.C. — 6623
Girl Scout Troop 395 — 6831
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition — 14870, 14941, 15126, 15139, 15239, 15420, 15792
Haney Truck Line, Inc. — 9031
Heartland Realty Investors, Inc. — 8320
Hogue's Ravenoak — 10715
Holmhaven — 2788
Idaho Wildlife Federation of Boise — 14871
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
Indiana Wildlife Federation — 5576
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 14484, 14838, 15240, 15290
Jackson Hole Conservation Alliance — 15124a
Jerabek Elementary School — 5th Grade — 17872
Jessie M. Harris, Flower and Nature Photography — 7373
Lake Area Hamilton Stores — 6332
Lance W. Holter, Real Estate and Construction — 9439
Leonard, Street and Deinard — 9801
Little Wound School–3rd Grade — 17682
Lockwood Properties Trust — 9649
Lone Wolf Services — 15728
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Lower Sioux Indian Community — 15811
Mariposa Mobile Veterinary Service — 15729
Meagher County Sportman Association — 15674
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Microban Products Company — 7014
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Chippewa Tribe — 10349
Minnesota Conservation Federation — 10495
Minnesota State, Indian Affairs Council — 10031
Mississippi Wildlife Federation — 10645
Montana Farm Bureau Federation — 14834
Montana House of Representatives — 8872
Montana State Senate — 15316
Montana Stockgrowers Association — 14939, 15246

Montana Tribal Fish and Wildlife Commission — 15363
Montana Wilderness Association — 15257
Montana Wildlife Federation — 15234
Moseley Outdoor Advertising — 7674
Mundt and Associates — 760
National Parks and Conservation Association — 14913, 15196a, 15367
National Wildlife Federation — 14819, 14827, 14874, 14890, 14923, 15083, 15131, 15142, 15188a, 15245, 15262
Natural Resources Defense Council — 15803
New Jersey Veterans Memorial Home — 2548
Nez Perce Tribal Executive Committee — 11409a
North American Bison Society — 1754
North Fork Preservation Association — 8383
Northern Cheyenne Tribe — 14839
Northfork Ranch — 2530
NovelTech Inc. — 4764
Oglala Lakota College — 14408, 15384
Ohio Environmental Council — 2697
Peter H. Dierlich Associates — 3282
Planetary Productions, Ltd. — 3916
Portneuf Environmental Council — 13111
Prairie Island Tribal Council — 15812
Predator Project — 15332
Pueblo of Pojoaque — 5730
Quality Transportation Services — 3016
River Bend Ranch — 4868
Riverway Consensus Standard Foundation — 15269
Rock Springs 4-H Center — 9656
Rolyboh International, Inc. — 2768
Santee Cooper — 15870d
Save Our Earth — 6963
SEIEN (Southeast Idaho Environmental Network) — 1211
Selah Bamberger Ranch — 4037
Shakopee Mdewakanton Sioux Community — 8827
Sierra Club, Central Florida Group — 3659
Sierra Club, Minnesota — 15296
Sierra Club, Placer Group — 9825
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Texas Lone Star Chapter — 15094
Smith and Doherty, PLLC — 15368
Snavely Forest Products — 16797
Snider Hardwoods — 5120
South Carolina Wildlife Federation — 9668
Southeast Montana Sportsman Association — 14855
Spiriti Heart Productions — 15305
St. Labre Volunteers — 11096
Star Watcher Productions — 6708
Sun City Friends of Animals, Inc. — 7846
Trimbelle Rod and Gun Club — 10109
Trout Creek Ranch — 1236
Trout Unlimited, Rio Grande Chapter — 9369
United States Senate, South Dakota — 17861
United Tribes Technical College — 14455
Valley Middle School — 5191
Virginia 10th District Environmental Council — 11398
Virginia Wildlife Federation — 1946
Wade Gallery — 9858
Washington Wildlife Federation — 16709, 4538
Wild Birds Unlimited — 12059
Wild Rockies InfoNet — 15545
Wilderness Society — 14909, 14979, 15209a
Winnebago Tribe of Nebraska — 14563
Wyoming Wildlife Federation — 14397, 14825, 14875, 14918, 15127
Yeates, J. William, Attorney at Law — 9702
Yell County Wildlife Federation — 2521

Bison

Capture/Test/Slaughter Operations (BI-5)

Alabama Cooperative Extension System — 14431
Alpine Environmental, Inc. — 9079
American Association of Wildlife Veterinarians — 5638
American Indian Movement — 15261, 15297
American Veterinary Medical Association — 8846
Andersons Arsenal — 2563
Animal Rights Alliance. See Schubert & Associates — 10110
Arlington Conservation Council — 7052
Artistic Features Art Studio — 6152
Assiniboine Tribe — 14844, 17724
Association of Veterinarians for Animal Rights — 2653
Audubon Society, Bexar — 7059
Audubon Society, Boulder County — 1476
Audubon Society, Evergreen Naturalists — 15572
Audubon Society, Prairie Wood — 8200
Audubon Society, Travis — 15082
Ayurvedic Rehabilitation Center — 753
Backyard Designs — 1434
Blaise Hayward Studio — 9413
Blue Water Publishing, Inc. — 10530
Boesche, McDermott and Eskridge — 6201
Boocks Farm — 16778
Bruce Jackson Photography — 3795
Buffalo Gap Land Rescue — 14911

Buffalo Nations — 15187
C. W. Roders Enterprises — 3022
California Federation for Animal Legislation — 336
California, County of Sacramento — 10336
Cefali and Cefali Attorneys at Law — 1690
Cheyenne River Sioux Tribe — 15079, 15133a, 17720, 17752, 17758
Chippewa Cree Indians — 14837
Civitas — 14226
Coffee Shaman — 794
Cold Mountain, Cold Rivers — 15366
Colorado State University, Natural Resource Ecology Laboratory — 9308
Colorado Wildlife Alliance — 6045
Commanche Caddo — 15112
Committee for Children — 420
Committee for Responsible Growth — 6057
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Conservation Council for Hawaii — 5015
Cornelia Connelly School — 4216
Crabtree Ridge Farm — 16577
Crow Tribe — 17711
D. Lindsay Pettus Real Estate — 7034
David L. Bourgoin Law Offices — 4104
David Spagat, Ltd. — 8011
Deerlodge Forest Defense Fund — 13055
Diamond K Outfitters, Inc. — 10722
Don Devine's Studio — 7731
Earth Island Institute — 15799
EarthWalk Spiritual Ministry — 16643
Ecological Consulting Services — 13073
Ecology Center — 15150, 15254, 15671
Edmonds Institute — 15517
Environmental Council of Rhode Island — 16339
Environmental Protection Information Center — 14337
Ethics Outreach — 8664
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
Flandreau Santee Sioux Tribe — 194
Flathead Wildlife — 10816
Frente Zapatista — 14896
Friends of Animals and Their Environment and Faith — 15270
Friends of the Bitterroot — 8639
Friends of the Wild Swan — 15237
Fund for Animals — 15123, 15197a
Gallatin Wildlife Association — 14935
Geyser Gazette — 14367
Girl Scout Troop 395 — 6831
Glasgow Area Chamber of Commerce and Agriculture — 2029
Goldstar Jewellery Pvt. Ltd. — 4536
Grassland Heritage Foundation — 9158
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 15420
Gros Ventre Tribe — 17732
H. F. Magnuson Company — 458
Hagenbarth Livestock — 10638
Harmony Middle School — 6th Grade — 17683
Hogue's Ravenoak — 10715
Humane Education Network — 11441, 473
Humane Legislative Network — 6535
Humane Society of the United States — 15129
Humane Society, Golden State — 5948
Humane Society, Marion County — 9678
Humane Society, Seneca County — 9062
Humane Society, Tampa Bay — 6881
Idaho Cattle Association — 11160
Idaho Mythweaver — 14439
In Defense of Animals — 15193a
Indiana Wildlife Federation — 5576
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 14838, 15189a, 15290, 17714
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Jackson Hole Conservation Alliance — 15329
Jerabek Elementary School — 5th Grade — 17872
Jessie M. Harris, Flower and Nature Photography — 7373
Kelly, Hart and Hallman — 8158
Kettle Range Conservation Group — 9328
LaCrosse Associates — 13033a
Last Chance for Animals. See Schubert & Associates — 10110
League in Support of Animals — 1780
Lemon Bay High School — 11089
Leonard, Street and Deinard — 9801
Lichtenfeld, Mark, Attorney at Law — 751
Little Wound School–3rd Grade — 17682
Livestock Conservation Institute — 9686
Lone Wolf Services — 15728
Lortz Manufacturing Company — 2861
Manitoba Animal Alliance — 150
Marshall Elementary School — 4th Grade — 17681
Maryland Coalition for Animal Rights — 11529

Metrics Unlimited Inc. — 3087
Michigan United Conservation Clubs — 8843
Minnesota Chippewa Tribe — 10349
Mississippi Wildlife Federation — 10645
Montana Ecosystems Defense Council — 15165, 9592
Montana International Incorporated — 15252
Montana Stockgrowers Association — 14832, 14833, 14878, 14939, 15241, 15349
Montana Wildlife Federation — 15234
Morgan, Franich, Fredkin, and Marsh — 5989
Moseley Outdoor Advertising — 7674
Mundt and Associates — 760
National Bison Association — 9097
National Parks and Conservation Association — 14913, 15196a, 15367
National Wildlife Federation — 14819, 14827, 14923, 15188a, 15262
Natural Resources Defense Council — 15803
New Jersey Animal Rights Alliance — 11137
New Jersey Environmental Lobby — 1739
New Jersey Veterans Memorial Home — 2548
Nez Perce Tribal Executive Committee — 11409a
North Central Ohio Nature Preservation League — 281, 3288, 619
North Fork Preservation Association — 8383
Northern Cheyenne Tribe — 14839, 14852
Northwest BuildNet, Internet Marketing — 16852
Oglala Lakota College — 14408
Oglala Sioux Tribe — 15258, 4018
Orange County People for Animals — 3836
Oregon Department of Agriculture — 14362
People for the USA — 13483
Portneuf Environmental Council — 13111
Preserve Appalachian Wilderness — 9058
Presidente Tribale Nazioni Assiniboine e Sioux — 17963
Pueblo of Pojoaque — 5730
Purdy Ranches — 10100
Raven Trails — 1303
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
Rock Springs 4-H Center — 9656
Rocky Mountain Animal Defense — 14700, 14920, 14921
Rolyboh International, Inc. — 2768
Russell Lamb Photography — 4495
S.K.U.N.K.S — 16751
Sacred Earth Network — 9359
Santee Cooper — 15870d
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
SEIEN (Southeast Idaho Environmental Network) — 1211
Seventh Generation Fund — 15565
Shakopee Mdewakanton Sioux Community — 8827
Shoshone-Bannock Tribes — 17749
Sierra Club, Big River Group — 8850
Sierra Club, Black Hills Group — 15199
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Montana Chapter — 15172
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Texas Lone Star Chapter — 15094
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Silver Cloud Farm — 8110
Sinapu — 14928
Sisseton Wahpeton Sioux Tribe — 17713
Snavely Forest Products — 16797
South Carolina Wildlife Federation — 9668
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
SPEAK — 10071
St. Labre Volunteers — 11096
Star B Ranch. See National Bison Association — 15187a
Station Middle School — 5187
Stuyvesant High School, American Habitat Club — 8592
Sun City Friends of Animals, Inc. — 8715a
Teen Animal Protectors — 16576
Texas and Southwestern Cattle Raisers Association — 14338
Texas Committee on Natural Resources — 15081
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Thunder Nation — 15280
Turner Foundation Inc. — 11514
Union Furnace Elementary School–3rd Grade — 17685
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
University of California, Cooperative Extension — 9122
Valley Middle School — 5191
Voice for Wildlife — 11490
Washington Elementary School — 6th Grade — 17680

Washington Wildlife Federation — 16709, 4538
Wild Rockies InfoNet — 15545
Wilderness Society — 14979
Wildlands Center for Preventing Roads — 15354
Wildlife Rehabilitation and Refuge Center — 374
Winnebago Tribe of Nebraska — 14563
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Stock Growers Assoc. — 14826
Wyoming Wildlife Federation — 14875, 14918
Yeates, J. William, Attorney at Law — 9702

Definition of Low Risk (BI-6)
Alliance for the Wild Rockies — 8616
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Cheyenne River Sioux Tribe — 17751
Deerlodge Forest Defense Fund — 13055
Defenders of Wildlife — 14980
Environmental Protection Agency — 14356
Friends of the Wild Swan — 15237
Greater Yellowstone Coalition — 15420
Heartwood. See Preserve Appalachian Wilderness — 15372
Idaho State Governor — 11121
InterTribal Bison Cooperative — 14484
Montana State Senate — 15316
Montana Stockgrowers Association — 15246
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819, 14827, 14874, 14890, 14923, 15245
Preserve Appalachian Wilderness — 15372, 9058
Santee Cooper — 15870d
Vermont Department of Agriculture, Food and Markets — 7485
Wild Rockies InfoNet — 15545
Wyoming Livestock Board — 14820
Wyoming Wildlife Federation — 14918

Distribution (Carcasses) (BI-7)
Assiniboine Tribe — 17708
Cheyenne River Sioux Tribe — 17752
Cold Mountain, Cold Rivers — 15366
Colorado Grizzly Project — 2555
Commanche Caddo — 15112
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17736
Flandreau Santee Sioux Tribe — 194
Greater Yellowstone Coalition — 15420
InterTribal Bison Cooperative — 17714
Montana Tribal Fish and Wildlife Commission — 15363
National Wildlife Federation — 14819
Nez Perce Tribal Executive Committee — 11409a
Shoshone-Bannock Tribes — 17741, 17745
Star B Ranch — 15187a

Distribution (Live) (BI-8)
Adventurer Tours — 13442
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Allen, Jack, Attorney at Law — 11097
Alliance for the Wild Rockies — 8616
Alpine Environmental, Inc. — 9079
American Association of Wildlife Veterinarians — 5638
American Farm Bureau Federation — 13356
American Legion, Miami Beach No.85 — 2690
American Veterinary Medical Association — 8846
Andersons Arsenal — 2563
Anti-Vivisection Society of America — 4182
Arlington Conservation Council — 7052
Assiniboine Tribe — 17708, 17725, 17727, 17728, 17731
Audubon Society, Alabama Council — 9740
Audubon Society, Montana Chapter — 14568
Audubon Society, Boulder County — 1476
Audubon Society, Conococheague — 4105
Audubon Society, Last Chance — 8879
Backyard Designs — 1434
Baker Animal Hospital — 8926
Bruce Jackson Photography — 3795
C. W. Roders Enterprises — 3022
California Dept of Food and Agriculture — 9243
California, County of Sacramento — 10336
Cefali and Cefali Attorneys at Law — 1690
Cheyenne River Sioux Tribe — 15133a, 17753, 17755
City Living Realtors — 7858
Coffee Shaman — 794
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735, 9371
Confederated Tribes of the Yakama Indian Nation — 11029
Conservation Council for Hawaii — 5015

Crabtree Ridge Farm — 16577
Crow Tribe — 17716
Daniel C. Hughes, Jr., Investment Properties — 10240
Dawson Medical Group — 4408
Defenders of Wildlife — 14980
Double Spear Ranch — 9063
EarthWalk Spiritual Ministry — 16643
EB3 Ranch — 1722
EcoSys Alert — 1287
Environmental Council of Rhode Island — 16339
Family Medicine — 7755
FaunaWest Wildlife Consultants — 10656
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Gallatin Wildlife Association — 14935, 15233
Georgia Surgical Associates, P.C. — 6623
Geyser Gazette — 14367
Girl Scout Troop 395 — 6831
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition — 14941, 15126, 15420
Gros Ventre Tribe — 17732, 17733
Hagenbarth Livestock — 10638
Harmony Middle School — 6th Grade — 17683
Heartland Realty Investors, Inc. — 8320
Hogue's Ravenoak — 10715
Honor the Earth — 4490
Idaho Mythweaver — 14439
Idaho Watersheds Project — 15317
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 14484, 14838, 15189a, 15240, 15290, 17714
Iowa Wildlife Federation, Inc. — 12035
Jackson Hole Conservation Alliance — 15124a
League of Kentucky Sportsmen, Inc. — 9153
Leonard, Street and Deinard — 9801
Light Touch Chiropractic — 5682
Lockwood Properties Trust — 9649
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Microban Products Company — 7014
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316
Montana Tribal Fish and Wildlife Commission — 15363
Mundt and Associates — 760
National Bison Association — 9097
National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819, 14846, 14890, 15131
Natural Resources Defense Council — 15803
New Jersey Veterans Memorial Home — 2548
Nez Perce Tribal Executive Committee — 11409a
Northern Arapaho Tribe — 17722
Northern Cheyenne Tribe — 14852
Northwest BuildNet, Internet Marketing — 16852
NovelTech Inc. — 4764
Oglala Lakota College — 14408, 15384
Oglala Sioux Tribe — 17757
Ohio Environmental Council — 2697
Oregon Natural Resources Council — 2775
Patino-Treat and Rosen, Attorneys at Law — 9144
People for the USA — 13483
Peter H. Dierlich Associates — 3282
Prairie Island Tribal Council — 15812
Pueblo of Pojoaque — 5730
Raven Trails — 1303
Republicans for Environmental Protection — 14892
River Bend Ranch — 4868
Rock Springs 4-H Center — 9656
Rolyboh International, Inc. — 2768
S.K.U.N.K.S — 16751
Santee Cooper — 15870d
SEIEN (Southeast Idaho Environmental Network) — 1211
Shoshone-Bannock Tribes — 17745
Sierra Club — 15804
Sierra Club, Black Hills Group — 15199
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Wyoming Chapter — 15130
Snider Hardwoods — 5120
St. Labre Volunteers — 11096
Star B Ranch. See National Bison Association — 15187a
Station Middle School — 5187
TMR Inc. — 17853

Trout Creek Ranch — 1236
Utah Wildlife Federation — 9301
Valley Middle School — 5191
Van Hyning and Associates, Inc. — 7484
Wade Gallery — 9858
Western Wildlife Health Cooperative — 4433
Wild Birds Unlimited — 12059
Wilderness Society — 15209a
Wildlife Society — 14309
William P. Cook and Associates, PLLC — 1081
Winnebago Tribe of Nebraska — 17709
Wyoming Stock Growers Assoc. — 15215
Wyoming Wildlife Federation — 14397, 14875, 15127
Yeates, J. William, Attorney at Law — 9702

Effects on Free-Ranging Status and Distribution (BI-9)

Adventurer Tours — 13442
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
All Aboard Travel — 7561
Alpine Environmental, Inc. — 9079
American Lands Alliance — 3037
American Reform Party — CA — 4354
Animal Protection Institute — 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Arlington Conservation Council — 7052
Aspen Trading Post — 11902
Assiniboine Tribe — 14850, 17725
Audio Press — 14438
Audubon Society, Alabama Council — 9740
Audubon Society, Bexar — 7059
Audubon Society, Conococheague — 4105
Audubon Society, Last Chance — 8879
Audubon Society, Prairie Wood — 8200
Baker Animal Hospital — 8926
Baldwin Realty — 705
Bear Creek Council — 8871
Blue Ribbon Coalition, Inc. — 7262
Boesche, McDermott and Eskridge — 6201
Boocks Farm — 16778
Bridging the Gap — 2116
Buffalo Gap Land Rescue — 14911
Buffalo Nations — 15187
Cabinet Resource Group — 14600
California, County of Sacramento — 10336
Cheyenne River Sioux Tribe — 15133a
Chippewa Cree Indians — 14837
City Living Realtors — 7858
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Tribes of the Yakama Indian Nation — 11029
Crabtree Ridge Farm — 16577
Daniel C. Hughes, Jr., Investment Properties — 10240
Deerlodge Forest Defense Fund — 13055
Double Spear Ranch — 9063
Earth Island Institute — 15214a
East Ascension Sportsmans League Inc. — 14737
EB3 Ranch — 1722
Ecological Consulting Services — 13073
Ecology Center — 15150, 15671
EcoSys Alert — 1287
Environmental Protection Information Center — 14337
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
First Alabama Bank of Birmingham — 262
First Congregational Church — 1298
Flathead Wildlife — 10816
Florida Wildlife Organization — 14915
Friends of Animals — 5937
Friends of Animals and Their Environment and Faith — 15270
Friends of Native Americans — 13545
Friends of the Bitterroot — 8639
Friends of the Wild Swan — 15237
Fund for Animals — 15124
Gallatin Wildlife Association — 15233
Georgia Surgical Associates, P.C. — 6623
Geyser Gazette — 14367
Girl Scout Troop 395 — 6831
Greater Yellowstone Coalition — 14870, 14941, 15126, 15420
Haney Truck Line, Inc. — 9030, 9031
Heartland Realty Investors, Inc. — 8320
Heartwood. See Preserve Appalachian Wilderness — 15372
Herbst Lazy TY Cattle Co. — 17856
Holmhaven — 2788
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
Idaho Mythweaver — 14439
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
Indiana Wildlife Federation — 5576
Inherit the Earth — 1923

InterTribal Bison Cooperative — 14484, 15240, 15290
Jackson Hole Conservation Alliance — 15329
Kaniksu Bioregional Council — 5168
Kettle Range Conservation Group — 10524
Last Chance for Animals. See Schubert & Associates — 10110
League of Kentucky Sportsmen, Inc. — 9153
Leonard, Street and Deinard — 9801
Livestock Conservation Institute — 9686
Lockwood Properties Trust — 9649
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Mennen Environmental Foundation — 6846
Michigan United Conservation Clubs — 8843
Microban Products Company — 7014
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Montana Ecosystems Defense Council — 15165
Montana State Senate — 14843, 15316
Morgan, Franich, Fredkin, and Marsh — 5989
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913, 15367
National Rifle Association Coalition — 15211a
National Wildlife Federation — 14890
Natural Resources Defense Council — 15803
North Dakota Department of Agriculture, Board of Animal Health — 8440
North Fork Preservation Association — 8383
Northern Cheyenne Tribe — 14839
Northfork Ranch — 2530
Northwest BuildNet, Internet Marketing — 16852
NovelTech Inc. — 4764
Oglala Lakota College — 14408
Oglala Sioux Tribe — 15258
Ohio Environmental Council — 2697
Oregon Natural Resources Council — 2775
Patino-Treat and Rosen, Attorneys at Law — 9144
People for the USA — 13483
Peter H. Dierlich Associates — 3282
Predator Education Fund — 14894
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Presidente Tribale Nazioni Assiniboine e Sioux — 17963
Pueblo of Pojoaque — 5730
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
River Bend Ranch — 4868
Riverway Consensus Standard Foundation — 15269
Rock Springs 4-H Center — 9656
Rocky Mountain Animal Defense — 14700, 14920
Rolyboh International, Inc. — 2768
Save Our Earth — 6963
Schubert & Associates — 10110, 14714
Shakopee Mdewakanton Sioux Community — 8827
Shoshone-Bannock Tribes — 14775, 17741, 17748, 17750
Sierra Club — 15804
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Central Florida Group — 3659
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Delta Group of San Francisco — 11018
Sierra Club, East Idaho Group — 14877
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Rocky Mountain Chapter — 15726
Sierra Club, Texas Lone Star Chapter — 15094
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Silver Cloud Farm — 8110
Sinapu — 14928
Snider Hardwoods — 5120
Southeast Montana Sportsman Association — 14855, 14861
St. Labre — 13330
Star B Ranch — 15187a
Sun City Friends of Animals, Inc. — 7846
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Creek Ranch — 1236
Trout Unlimited, Rio Grande Chapter — 9369
United States Animal Health Association — 9364
Utah Department of Agriculture and Food — 14887
Utah Wildlife Federation — 9301

Valley Middle School — 5191
Wade Gallery — 9858
Washington Wildlife Federation — 16709
Western Wildlife Health Cooperative — 4433
Wild Birds Unlimited — 12059
Wild Rockies InfoNet — 15545
Wildlife Damage Review — 7555
William P. Cook and Associates, PLLC — 1081
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
WPKR and WPCK Radio — 887
Wyoming Stock Growers Assoc. — 15128
Wyoming Wildlife Federation — 14397, 14875, 15127
Yeates, J. William, Attorney at Law — 9702

Humane Treatment (BI-10)
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 14850, 17708
Blaise Hayward Studio — 9413
Boesche, McDermott and Eskridge — 6201
Buffalo Gap Land Rescue — 14911
Cold Mountain, Cold Rivers — 15366
Commanche Caddo — 15112
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Don Devine's Studio — 7731
Earth Island Institute — 15799
Ecology Center — 15150, 15671
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
Friends of Animals — 5937
Fund for Animals — 15124, 15197a
Geyser Gazette — 14367
Grassland Heritage Foundation — 9158
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441
Humane Society of the United States — 15129
Idaho Farm Bureau Federation — 11433
Inherit the Earth — 1923
Kelly, Hart and Hallman — 8158
Last Chance for Animals. See Schubert & Associates — 10110
Montana Farm Bureau Federation — 14834
North Central Ohio Nature Preservation League — 619
Preserve Appalachian Wilderness — 15372
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14921
Santee Cooper — 15870d
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Delta Group of San Francisco — 11018
Silver Cloud Farm — 8110
Southeast Montana Sportsman Association — 14855
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
Station Middle School — 5187
Sun City Friends of Animals, Inc. — 8715a
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Valley Middle School — 5191
Wild Rockies InfoNet — 15545
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Yell County Wildlife Federation — 7319

Hunting (BI-11)
Allen, Jack, Attorney at Law — 11097
Alliance for the Wild Rockies — 8616
American Association of Wildlife Veterinarians — 5638
Andersons Arsenal — 2563
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 17726
Association of Veterinarians for Animal Rights — 2653
Audubon Society, Boulder County — 1476
Backyard Designs — 1434
Billings Rod and Gun Club — 14867
Blaise Hayward Studio — 9413
Blue Ribbon Coalition, Inc. — 14884
C. W. Roders Enterprises — 3022
California Federation for Animal Legislation — 336
Cefali and Cefali Attorneys at Law — 1690
Cheyenne River Sioux Tribe — 17754, 17755
Coffee Shaman — 794
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Children — 420

Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17736, 17738
Conservation Council for Hawaii — 5015
Cornelia Connelly School — 4216
Defenders of Wildlife — 14980
Don Devine's Studio — 7731
Doris Day Animal League — 14383
Earth Island Institute — 15799
Ecological Consulting Services — 13073
Edmonds Institute — 15517
Environmental Protection Information Center — 14337
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Friends of Animals and Their Environment and Faith — 15270
Fund for Animals — 15123, 15124, 15197a
Gallatin Wildlife Association — 14935, 15233
Goldstar Jewellery Pvt. Ltd. — 4536
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 14941, 15420
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441, 473
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
Humane Society, Seneca County — 9062
Humane Society, Tampa Bay — 6881
Idaho State Governor — 11121
Idaho State Snowmobile Association — 10491
Idaho Watersheds Project — 15317
Indigo Girls — 14205
International Defenders of Animals, Inc. — 6283
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 17714
Izaak Walton League — 15263, 15304
Jack Atcheson and Sons, Inc. — 3627
Jackson Hole Conservation Alliance — 15329
Jessie M. Harris, Flower and Nature Photography — 7373
Kelly, Hart and Hallman — 8158
Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Livestock Conservation Institute — 9686
Lortz Manufacturing Company — 2861
Manitoba Animal Alliance — 150
Maryland Coalition for Animal Rights — 11529
Meagher County News — 15377
Meagher County Sportman Association — 15674
Metrics Unlimited Inc. — 3087
Michigan United Conservation Clubs — 8843
Minnesota Chippewa Tribe — 10349
Montana Coalition for Appropriate Mgmt. of State Land — 994
Montana State Senate — 14843, 15316, 940
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wildlife Federation — 15234
Moseley Outdoor Advertising — 7674
Mundt and Associates — 760
National Bison Association — 9097
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913
National Rifle Association — 2838
National Wildlife Federation — 14819
New Jersey Animal Rights Alliance — 11137
Oglala Lakota College — 14408
Patino-Treat and Rosen, Attorneys at Law — 9144
People for the USA — 13483
Preserve Appalachian Wilderness — 15372
Quality Transportation Services — 3016
Respect for Life Society — 188
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14700, 14921
Rolyboh International, Inc. — 2768
Russell Lamb Photography — 4495
Safari Club International — 8810
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
SEIEN (Southeast Idaho Environmental Network) — 1211
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 14775, 17742, 17745
Sierra Club, Mount Evans Group — 10156
Sierra Club, Placer Group — 9825
Sierra Club, Wyoming Chapter — 15130
Silver Cloud Farm — 8110
Sinapu — 14540
Southeast Montana Sportsman Association — 14855, 14861
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
SPEAK — 10071

Star B Ranch. See National Bison Association — 15187a
Stuyvesant High School, American Habitat Club — 8592
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
Utah Wildlife Federation — 9301
Van Hyning and Associates, Inc. — 7484
Western Wildlife Health Cooperative — 4433
Wild Rockies InfoNet — 15545
Wildlands Center for Preventing Roads — 15354
Wildlife Management Institute — 5455
Wildlife Rehabilitation and Refuge Center — 374
Wildlife Society — 14309
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Game and Fish Department — 9268
Wyoming Wildlife Federation — 14397, 14875, 15127
Yell County Wildlife Federation — 7319

Population (BI-12)

Alabama Cattlemen's Association — 9729
Alabama Department of Agriculture and Industries — 9839
Alliance for the Wild Rockies — 8616
American Association of Wildlife Veterinarians — 5638
American Farm Bureau Federation — 13356
American Reform Party — CA — 4354
American Veterinary Medical Association — 8846
Andersons Arsenal — 2563
Animal Protection Institute — 11124, 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Apple Country Snowmobile Club — 9255
Arlington Conservation Council — 7052
Assiniboine Tribe — 14850, 17725
Audubon Society, Bexar — 7059
Audubon Society, Last Chance — 8879
Audubon Society, Prairie Wood — 8200
Backyard Designs — 1434
Baker Animal Hospital — 8926
Baldwin Realty — 705
Blue Ribbon Coalition, Inc. — 14884
Bridging the Gap — 2116
C. W. Roders Enterprises — 3022
California Farm Bureau Federation — 15806
California, County of Sacramento — 10336
Cheyenne River Sioux Tribe — 17754
Chippewa Cree Indians — 14837
City Living Realtors — 7858
Cody Conservation District Board — 14829
Cold Mountain, Cold Rivers — 15366
Colorado State University, Natural Resource Ecology Laboratory — 9308
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Tribes of the Yakama Indian Nation — 11029
Daniel C. Hughes, Jr., Investment Properties — 10240
Defenders of Wildlife — 14980
Double Spear Ranch — 9063
Earth Island Institute — 15799
EB3 Ranch — 1722
Ecology Center — 15150, 15671
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
First Congregational Church — 1298
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Friends of the West — 191
Friends of the Wild Swan — 15237
Fund for Animals — 15123, 15124
Gallatin Wildlife Association — 14935, 15233
Georgia Department of Agriculture — 11108, 9000
Glasgow Area Chamber of Commerce and Agriculture — 2029
Grassroot for Multiple Use — 14285
Greater Yellowstone Coalition — 14941, 15126, 15420
H. F. Magnuson Company — 458
Hagenbarth Livestock — 10638
Heartland Realty Investors, Inc. — 8320
Heartwood. See Preserve Appalachian Wilderness — 15372
Herbst Lazy TY Cattle Co. — 17856
Humane Education Network — 473, 11441
Humane Society of the United States — 15129
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Idaho State Snowmobile Association — 10491
Idaho Watersheds Project — 15317

Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
InterTribal Bison Cooperative — 14484, 14838, 15189a
Jackson Hole Conservation Alliance — 15124a, 15329
Kaniksu Bioregional Council — 5168
Keenan Ranch — 9111
Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Livestock Conservation Institute — 9686
Lockwood Properties Trust — 9649
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453, 12050
Lower Brule Sioux Tribe — 9107, 9108
Manitoba Animal Alliance — 150
Meagher County News — 15377
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Michigan United Conservation Clubs — 8843
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Montana Ecosystems Defense Council — 15165
Montana Farm Bureau Federation — 14816, 14834, 14836, 15147
Montana Farm Bureau Federation — 14836, 15147
Montana House of Representatives — 14851, 14857, 15668
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 940, 14843, 15316
Montana State University, Extension Range Management — 2919
Montana Stockgrowers Association — 14832, 14833, 14847, 14939, 15160, 15349
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wilderness Association — 15257
Mt. Shasta Sno-Mobilers, Inc. — 11058, 9124
National Bison Association — 9097
National Cattlemen's Beef Association — 11138
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913, 15367
National Rifle Association — 2838
National Wildlife Federation — 14819, 14846, 14874, 15142
Native Forest Network — 4102
Nez Perce Tribal Executive Committee — 11409a
North Dakota Department of Agriculture, Board of Animal Health — 8440
Northern Rockies Preservation Project — 5064
Oglala Lakota College — 14408
Oregon Dairy Farmers Association — 15850
Oregon Natural Resources Council — 2775
Pain Relief Center — 9543
Patino-Treat and Rosen, Attorneys at Law — 9144
People for the USA — 13483
Prairie Island Tribal Council — 15812
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Raven Trails — 1303
Respect for Life Society — 188
River Bend Ranch — 4868
Rocky Mountain Animal Defense — 14700, 14920
Russell Lamb Photography — 4495
Schubert & Associates — 10110, 14714
Seeley Lake Driftriders — 8638
Shoshone-Bannock Tribes — 17743
Sierra Club — 15804
Sierra Club, Berks Group — 297
Sierra Club, Big River Group — 8850
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Black Hills Group — 15199
Sierra Club, Central Florida Group — 3659
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, East Idaho Group — 14877
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Rocky Mountain Chapter — 15726
Sierra Club, Texas Lone Star Chapter — 15094
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Skyline Sportsmen's Association, Inc. — 639
Society for Range Management — 15723
Southeast Montana Sportsman Association — 14855, 14861
Southeastern Livestock Association — 14848
Star B Ranch. See National Bison Association — 15187a
Stone Orchards — 9392
Taylor, John A., Attorney at Law — 11486

Texas and Southwestern Cattle Raisers Association — 14338
Texas Animal Health Commission — 9317
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Creek Ranch — 1236
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
Utah Department of Agriculture and Food — 14887, 15781
Utah Farm Bureau Federation — 15780
Utah Snowmobile Association — 9050
Valley SnoDrifters — 14277
Wade Gallery — 9858
Western Wildlife Health Cooperative — 4433
Wild Birds Unlimited — 12059
Wild Rockies InfoNet — 15545
Wildlife Management Institute — 5455
Wildlife Rehabilitation and Refuge Center — 374
Wildlife Society — 14309
William P. Cook and Associates, PLLC — 1081
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642
Wyoming Game and Fish Department — 9268
Wyoming Livestock Board — 14820
Wyoming State Governor — 14448
Wyoming Stock Growers Assoc. — 15122, 15215
Wyoming Wildlife Federation — 14397, 14825, 14875
Yeates, J. William, Attorney at Law – 9702
Yellowstone Arctic — Yamaha — 14501

Property Damage (BI-14)
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Florida Biodiversity Project — 9382
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition -15126, 15420
Heartwood. See Preserve Appalachian Wilderness — 15372
Idaho Mythweaver — 14439
InterTribal Bison Cooperative — 14484
Izaak Walton League — 15263
Kaniksu Bioregional Council — 5168
Keenan Ranch — 9111
Leonard, Street and Deinard — 9801
Montana State Senate — 15316
National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819
Preserve Appalachian Wilderness — 15372
Rocky Mountain Animal Defense — 14920
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Central Florida Group — 3659
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Delta Group of San Francisco — 11018
Sierra Club, East Idaho Group — 14877
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters – 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, Wyoming Chapter — 15130
Wyoming Wildlife Federation — 14397, 14875, 15127

Quarantine Operations (BI-15)
Alabama Cooperative Extension System — 14431
American Association of Wildlife Veterinarians — 5638
American Farm Bureau Federation — 13356
American Veterinary Medical Association — 8846
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 14850, 17725
Blaise Hayward Studio — 9413
Buffalo Nations — 14900
California Dept of Food and Agriculture — 9243
Cheyenne River Sioux Tribe — 17720
Cold Mountain, Cold Rivers — 15366
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735
Cornelia Connelly School — 4216
Defenders of Wildlife — 14980
Don Devine's Studio — 7731
Ecology Center — 15150, 15671
Environmental Protection Information Center — 14337
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
Flandreau Santee Sioux Tribe — 194

Florida Biodiversity Project — 9382
Fund for Animals — 15123, 15197a
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 15420
Gros Ventre Tribe — 17732
Heartwood. See Preserve Appalachian Wilderness — 15372
Ho-Chuck Nation — 17717
Humane Education Network — 11441, 473
Humane Society, Marion County — 9678
Humane Society, Seneca County — 9062
Idaho Mythweaver — 14439
Idaho Watersheds Project — 15317
In Defense of Animals — 15193a
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
InterTribal Bison Cooperative — 14484, 14838, 17712, 17714
Izaak Walton League — 15263, 15304
Kelly, Hart and Hallman — 8158
Kettle Range Conservation Group — 9328
LaCrosse Associates — 13033a
Last Chance for Animals. See Schubert & Associates — 10110
Montana Ecosystems Defense Council — 15165, 9592
Montana Farm Bureau Federation — 15242
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316
Montana Stockgrowers Association — 14832, 14833, 14847, 14878, 14939, 15241, 15349
Montana Tribal Fish and Wildlife Commission — 15363
National Bison Association — 9097
National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819, 14846
Native Forest Network — 4102
New Jersey Animal Rights Alliance — 11137
Nez Perce Tribal Executive Committee — 11409a
Northern Rockies Preservation Project — 5064
Oglala Lakota College — 15384
Patino-Treat and Rosen, Attorneys at Law — 9144
Preserve Appalachian Wilderness — 15372
Presidente Tribale Nazioni Assiniboine e Sioux — 17963
Pueblo of Pojoaque — 5730
Raven Trails — 1303
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14921
Sacred Earth Network — 9359
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Mount Evans Group — 10156
Sierra Club, Wyoming Chapter — 15130
Sinapu — 14540
Sisseton Wahpeton Sioux Tribe — 17713
SPCA, Animal Care and Welfare — 256
St. Labre Volunteers — 11096
Star B Ranch. See National Bison Association — 15187a
Station Middle School — 5187
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
United States Animal Health Association — 9364
Utah Wildlife Federation — 9301
Western Wildlife Health Cooperative — 4433
Wild Rockies InfoNet — 15545
Wildlands Center for Preventing Roads — 15354
Wildlife Rehabilitation and Refuge Center — 374
Wildlife Society — 14309
Winnebago Tribe of Nebraska — 17709
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14889
Wyoming Stock Growers Assoc. — 15128
Wyoming Wildlife Federation — 14397

Ranching (BI-16)
Florida Biodiversity Project — 9382
National Bison Association — 9097
National Wildlife Federation — 14827
Northern Cheyenne Tribe — 14852
Sierra Club, Black Hills Group — 15199
Star B Ranch. See National Bison Association — 15187a
Wyoming Farm Bureau Federation — 14642

Special Management Areas (BI-17)
Alabama Cattlemen's Association — 9729
Alabama Cooperative Extension System — 14431
Alabama Department of Agriculture and Industries — 9839
American Farm Bureau Federation — 13356
Andersons Arsenal — 2563
Arlington Conservation Council — 7052
Audubon Society, Last Chance — 8879

Backyard Designs — 1434
Baker Animal Hospital — 8926
Big Horn Livestock Association — 14841
C. W. Roders Enterprises — 3022
Clemson University, Department of Livestock Poultry Health Programs — 14336
Cold Mountain, Cold Rivers — 15366
Colville Confederated Tribes — 6990
Confederated Tribes of the Yakama Indian Nation — 11029
Daniel C. Hughes, Jr., Investment Properties — 10240
Double Spear Ranch — 9063
EB3 Ranch — 1722
Ecology Center — 15671
Family Medicine — 7755
Flandreau Santee Sioux Tribe — 194
Gallatin Wildlife Association — 15233
Georgia Department of Agriculture — 9000
Glasgow Area Chamber of Commerce and Agriculture — 2029
Greater Yellowstone Coalition — 14870, 15420
Hagenbarth Livestock — 10638
Heartland Realty Investors, Inc. — 8320
Herbst Lazy TY Cattle Co. — 17856
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Idaho State Governor — 11121
Illinois Department of Agriculture — 9446
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
Indiana State Board of Animal Health — 9361
InterTribal Bison Cooperative — 14484
Kansas Animal Health Department-Livestock Commission — 8455
Keenan Ranch — 9111
Leonard, Street and Deinard — 9801
Livestock Conservation Institute — 9686
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Board of Animal Health — 8993
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Montana Ecosystems Defense Council — 9592
Montana Farm Bureau Federation — 14816, 14836, 15147
Montana State Senate — 15316
Montana Stockgrowers Association — 14878, 15246
National Bison Association — 9097
National Cattlemen's Beef Association — 11138
National Parks and Conservation Association — 14913, 15367
Native Forest Network — 4102
Nez Perce Tribal Executive Committee — 11409a
Northern Rockies Preservation Project — 5064
Oglala Lakota College — 14408
Oregon Department of Agriculture — 14362
Prairie Island Tribal Council — 15812
River Bend Ranch — 4868
Rocky Mountain Animal Defense — 14700
Santee Cooper — 15870d
Sierra Club, Berks Group — 297
Sierra Club, Big River Group — 8850
Sierra Club, Placer Group — 9825
Southeast Montana Sportsman Association — 14855
Star B Ranch. See National Bison Association — 15187a
Texas and Southwestern Cattle Raisers Association — 14338
Trout Creek Ranch — 1236
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
University of California, Cooperative Extension — 9122
Utah Department of Agriculture and Food — 14887, 15781
Utah Farm Bureau Federation — 15780
Wade Gallery — 9858
Washington Cattlemen's Association — 14312
Washington Department of Agriculture — 10399
Western Wildlife Health Cooperative — 4433
Wild Birds Unlimited — 12059
Wild Rockies InfoNet — 15545
Wildlife Society — 14309
William P. Cook and Associates, PLLC — 1081
Wisconsin Department of Agriculture, Trade and Consumer Protection — 11531
Wyoming Farm Bureau Federation — 14642
Wyoming Livestock Board — 14820
Wyoming Stock Growers Assoc. — 15122, 15215
Wyoming Wildlife Federation — 14397, 14825

Special Management Areas — Authority to Manage (BI-18)
Environmental Protection Agency — 14356
Shoshone-Bannock Tribes — 14775

Special Management Areas — Proposed Boundaries (BI-19)
Greater Yellowstone Coalition — 15420
InterTribal Bison Cooperative — 14484
National Wildlife Federation — 14819
United States Animal Health Association — 9364

Vaccination (BI-20)
Alabama Cooperative Extension System — 14431
American Farm Bureau Federation — 13356
American Veterinary Medical Association — 8846
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Audubon Society, Montana Chapter — 14568
Blaise Hayward Studio — 9413
Cheyenne River Sioux Tribe — 17720, 17754, 17758
Colville Confederated Tribes — 6990
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Don Devine's Studio — 7731
Earth Island Institute -15799
Ecology Center — 15671
Edmonds Institute — 15517
Environmental Protection Information Center — 14337
Ethics Outreach — 8664
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Friends of Animals and Their Environment and Faith — 15270
Friends of the Bitterroot — 8639
Friends of the Wild Swan — 15237
Fund for Animals — 15124, 15197a
Georgia Department of Agriculture — 11108
Glasgow Area Chamber of Commerce and Agriculture — 2029
Greater Yellowstone Coalition — 14941, 15126, 15420
Hagenbarth Livestock — 10638
Hakansson, Carl G., Attorney at Law — 1905
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441, 473
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
Humane Society, Tampa Bay — 6881
Idaho Cattle Association — 11160
Idaho Mythweaver — 14439
Indigenous Support Coalition of Oregon — 15318
InterTribal Bison Cooperative — 14484, 14838
Jackson Hole Conservation Alliance — 15124a, 15329
Kansas Animal Health Department-Livestock Commission — 8455
Kelly, Hart and Hallman — 8158
Kettle Range Conservation Group – 9328
LaCrosse Associates — 13033a
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Lower Brule Sioux Tribe — 9107, 9108
Montana Ecosystems Defense Council — 15165
Montana House of Representatives — 14851, 14857
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316
Montana Stockgrowers Association — 14832, 14833, 14847, 14939, 15241
National Bison Association — 9097
National Cattle and Feed Association — 15130
National Cattlemen's Beef Association — 11138
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819, 14923, 15131, 15188a, 15262
Nez Perce Tribal Executive Committee — 11409a
North Central Ohio Nature Preservation League — 3288
Park County Ranchers Marketing Associates — 15183
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Raven Trails — 1303
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14700, 14920, 14921
Sacred Earth Network — 9359
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Sierra Club, Black Hills Group — 15199

Sierra Club, Minnesota — 15296
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540
Skyline Sportsmen's Association, Inc. — 639
Star B Ranch. See National Bison Association — 15187a
Texas Animals — 15074
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
Utah Wildlife Federation — 9301
Western Wildlife Health Cooperative — 4433
Wildlands Center for Preventing Roads — 15354
Wildlife Rehabilitation and Refuge Center — 374
Wisconsin Department of Agriculture, Trade and Consumer Protection — 11531
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14889
Wyoming Livestock Board — 14820
Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785
Wyoming State Governor — 14448
Wyoming Stock Growers Assoc. — 15215, 15785
Wyoming Wildlife Federation — 14397, 14825, 14875, 15127

Ecology (BI-51)

American Lands Alliance — 3037
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 14850
Buffalo Nations — 15187
Cheyenne River Sioux Tribe — 17752, 17754
Civitas — 14226
Cold Mountain, Cold Rivers — 15366
Friends of Animals — 5937
Fund for Animals — 15124
Greater Yellowstone Coalition — 15420
H. F. Magnuson Company — 458
Heartwood. See Preserve Appalachian Wilderness — 15372
Idaho State Governor — 11121
Indigo Girls — 14205
Izaak Walton League — 15263
Jackson Hole Conservation Alliance — 15329
Kettle Range Conservation Group — 10524, 9328
Montana Farm Bureau Federation — 15147
Montana State Senate — 14843
Montana Tribal Fish and Wildlife Commission — 15363
National Wildlife Federation — 14827
North Fork Preservation Association — 8383
Oglala Lakota College — 15384
Oglala Sioux Tribe — 4018
Predator Education Fund — 14894
Predator Project — 15332
Preserve Appalachian Wilderness — 15372
Raven Trails – 1303
Rolyboh International, Inc. — 2768
Safari Club International — 8810
Shoshone-Bannock Tribes — 17744, 17750
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, East Idaho Group — 14877
Sierra Club, Montana Chapter — 15172
Sierra Club, North Star Chapter — 15843
Silver Cloud Farm — 8110
Sinapu — 14540, 14928
Society for Range Management — 15723
Taylor, John A., Attorney at Law — 11486
Trout Unlimited, Rio Grande Chapter — 9369
United States Animal Health Association — 9364
Yell County Wildlife Federation – 2521

Brucellosis in Yellowstone Bison Herd (BI-22)

Adventurer Tours — 13442
Alabama Cattlemen's Association — 9729
Alabama Department of Agriculture and Industries — 9839
Alabama Farmers Federation — 9948
Alabama Veterinary Medical Association — 14607
American Association of Wildlife Veterinarians — 5638
Animal Protection Institute — 15186a
Arizona Department of Agriculture — 12033
Assiniboine Tribe — 17724, 17726, 17727, 17730
California Dept of Food and Agriculture — 9243
Cheyenne River Sioux Tribe — 17754
Colorado State University, Natural Resource Ecology Laboratory — 9308
Florida Biodiversity Project — 9382
Georgia Department of Agriculture — 11108, 9000
Georgia Farm Bureau Federation — 14398
Greater Yellowstone Coalition — 15420
Gros Ventre Tribe — 17732

Hagenbarth Livestock — 10638
Herbst Lazy TY Cattle Co. — 17856
Idaho Farm Bureau Federation — 11433
King Ranch — 8829
Livestock Conservation Institute — 9686
Louisiana Farm Bureau Federation, Inc. — 14293
Montana State Senate — 14843, 15316, 940
Montana Stockgrowers Association — 14847, 14853, 14878, 14939
Montana Tribal Fish and Wildlife Commission — 15363
National Bison Association — 9097
National Cattlemen's Beef Association — 11138
National Wildlife Federation — 14819, 14874, 14890
Nevada Department of Business and Industry, Division of Agriculture — 7526
North Carolina Department of Agriculture and Consumer Services — 8791
People for the USA — 13483
Shoshone-Bannock Tribes — 17749
Southeast Montana Sportsman Association — 14861
Southeastern Livestock Association — 14848
Star B Ranch. See National Bison Association — 15187a
United States Animal Health Association — 9364
University of California, Cooperative Extension — 9122
Utah Department of Agriculture and Food — 14887
Vermont Department of Agriculture, Food and Markets — 7485
Wilderness Society — 14909
Wildlife Management Institute — 5455
Wisconsin Department of Agriculture, Trade and Consumer Protection — 11531
Wyoming Farm Bureau Federation — 14642
Wyoming Stock Growers Assoc. — 15122, 15128, 15215

Brucellosis Testing (BI-23)
American Veterinary Medical Association — 8846
Animal Rights Alliance. See Schubert & Associates — 10110
Cabinet Resource Group — 14600
Cheyenne River Sioux Tribe — 17758
Colorado State University, Natural Resource Ecology Laboratory — 9308
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
East Ascension Sportsmans League Inc. — 14737
Farm Sanctuary. See Schubert & Associates — 10110
Flandreau Santee Sioux Tribe — 194
Georgia Department of Agriculture — 11108
Glasgow Area Chamber of Commerce and Agriculture — 2029
Harmony Middle School — 6th Grade — 17683
Idaho Farm Bureau Federation — 11433
InterTribal Bison Cooperative — 15240
Jerabek Elementary School — 5th Grade — 17872
Last Chance for Animals. See Schubert & Associates — 10110
Montana House of Representatives — 14857
Montana Stockgrowers Association — 14847
National Wildlife Federation — 14819, 14890, 14923, 15083
Nez Perce Tribal Executive Committee — 11409a
Patino-Treat and Rosen, Attorneys at Law — 9144
Rock Springs 4-H Center — 9656
Schubert & Associates — 10110, 14714
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785
Wyoming Stock Growers Assoc. — 14826, 15215, 15785

Brucellosis Transmission and Public Perception (BI-24)
Adventurer Tours — 13442
Alabama Cattlemen's Association — 9729
Alabama Cooperative Extension System — 14431
Alabama Department of Agriculture and Industries — 9839
Alabama Farmers Federation — 9948
Alabama Veterinary Medical Association — 14607
Alliance for the Wild Rockies — 8616
American Farm Bureau Federation — 13356
American Lands Alliance — 3037
American Veterinary Medical Association — 8846
Animal Protection Institute — 11124

Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Apple Country Snowmobile Club — 9255
Arlington Conservation Council — 7052
Assiniboine Tribe — 17724, 17726
Association of Veterinarians for Animal Rights — 2653
Audubon Society, Montana Chapter — 14568
Audubon Society, Bexar — 7059
Ayurvedic Rehabilitation Center — 753
Banff Environmental Action and Res. (BEAR) Soc. — 2397a
Bear Creek Council — 8871
Big Horn Livestock Association — 14841
Blue Ribbon Coalition, Inc. — 14884
Boocks Farm — 16778
Brushy Bottom Bison Basin — 13005
Buffalo Gap Land Rescue — 14911
Buffalo Nations — 14900, 15187
Cabinet Resource Group — 14600
California Dept of Food and Agriculture — 9243
California Farm Bureau Federation — 15806
California Federation for Animal Legislation — 336
Cheyenne River Sioux Tribe — 17754
Chippewa Cree Indians — 14837
Civitas — 14226
Clemson University, Department of Livestock Poultry Health Programs — 14336
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee for Responsible Growth — 6057
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Concerned People for Animals, Inc. — 1080
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735, 9371
Cornelia Connelly School — 4216
David Spagat, Ltd. — 8011
Deerlodge Forest Defense Fund — 13055
Defenders of Wildlife — 14980
Direct Response — 3822
Earth Island Institute -15799
EarthWalk Spiritual Ministry — 16643
East Ascension Sportsmans League Inc. — 14737
Ecology Center — 15150, 15671
Eilat Loves Animals — 192
Environmental Council of Rhode Island — 16339
Environmental Protection Agency — 14356
Ethics Outreach — 8664
Farm Sanctuary. See Schubert & Associates — 10110
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Friends of Animals — 419, 5937
Friends of Animals and Their Environment and Faith — 15270
Friends of the West — 191
Fund for Animals — 15123, 15197a
Georgia Department of Agriculture — 11108, 9000, 9229
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition — 15126, 15420
Gros Ventre Tribe — 17732
H. F. Magnuson Company — 458
Hagenbarth Livestock — 10638
Haney Truck Line, Inc. — 9031
Harmony Middle School — 6th Grade — 17683
Heartwood. See Preserve Appalachian Wilderness — 15372
Holmhaven — 2788
Honor the Earth — 4490
Humane Education Network — 11441, 473
Humane Society of the United States — 15129
Humane Society, Peoria — 5393
Humane Society, Tampa Bay — 6881
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Idaho Mythweaver — 14439
Illinois Department of Agriculture — 9446
Indiana Wildlife Federation — 5576
Indigo Girls — 14205
InterTribal Bison Cooperative — 17712
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Jessie M. Harris, Flower and Nature Photography — 7373
Kaniksu Bioregional Council — 5168
Kansas Animal Health Department-Livestock Commission — 8455
Keenan Ranch — 9111
Kettle Range Conservation Group — 10524
Last Chance for Animals. See Schubert & Associates — 10110
Lichtenfeld, Mark, Attorney at Law — 751
Livestock Conservation Institute — 9686
Lone Wolf Services — 15728

Louisiana Department of Agriculture and Forestry — 9020
Manitoba Animal Alliance — 150
Mariposa Mobile Veterinary Service — 15729
Marshall Elementary School — 4th Grade — 17681
Michigan United Conservation Clubs — 8843
Minnesota Board of Animal Health — 8993
Montana Farm Bureau Federation — 14816, 14834, 14836, 15147, 15242
Montana House of Representatives — 14857, 8872
Montana International Incorporated — 15252
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316, 940
Montana Stockgrowers Association — 14832, 14847, 14853, 14939, 15160, 15241, 15246
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wilderness Association — 15257
Montana Wildlife Federation — 15250
National Cattlemen's Beef Association — 11138
National Parks and Conservation Association — 14913
National Rifle Association — 2838
National Wildlife Federation — 14819, 14827, 14846, 14874, 14890, 15083, 15131, 15142, 15245, 15262
Native Forest Network — 4102
Natural Resources Defense Council — 15803
New Jersey Animal Rights Alliance — 11137
New Jersey Environmental Lobby — 1739
Nez Perce Tribal Executive Committee — 11409a
North Carolina Department of Agriculture and Consumer Services — 8791
North Central Ohio Nature Preservation League — 281
North Dakota Department of Agriculture, Board of Animal Health — 8440
Oglala Sioux Tribe — 15258, 4018
Ohio Environmental Council — 446
Oregon Cattlemen's Association — 15669
Oregon Dairy Farmers Association — 15850
Park County Ranchers Marketing Associates — 15183
Patino-Treat and Rosen, Attorneys at Law — 9144
Portneuf Environmental Council — 13111
Predator Education Fund — 14894
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Pueblo of Pojoaque — 5730
Rancho San Benito — 5791
Raven Trails — 1303
Respect for Life Society — 188
Rocky Mountain Animal Defense — 14700, 14920, 14921
Russell Lamb Photography — 4495
Safari Club International — 8810
Santee Cooper — 15870d
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 14775, 17740, 17744, 17745, 17747
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Central Florida Group — 3659
Sierra Club, Delta Group of San Francisco — 11018
Sierra Club, East Idaho Group — 14877
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Rocky Mountain Chapter — 15726
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540, 14928
South Carolina Wildlife Federation — 9668
South Dakota Animal Industry Board — 9102
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
SPEAK — 10071
St. Labre Volunteers — 11096
Station Middle School — 5187
Stuyvesant High School, American Habitat Club — 8592
Sun City Friends of Animals, Inc. — 8715a
Texas Animal Health Commission — 9317
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
United Sioux Tribes — 17719
United States Animal Health Association — 9364
Upper Sioux Community — 14701
Upstream Anglers and Outdoor Adventures — 7749
Utah Department of Agriculture and Food — 14887, 15781

Utah Farm Bureau Federation — 15780
Voice for Wildlife — 11490
Washington Cattlemen's Association — 14312
Washington Wildlife Federation — 4538
Washington Department of Agriculture — 10399
Wild Rockies InfoNet — 15545
Wilderness Society — 14979
Wildlands Center for Preventing Roads — 15354
Wildlife Damage Review — 7555
Wildlife Management Institute — 5455
Wildlife Rehabilitation and Refuge Center — 374
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642, 14889
Wyoming Game and Fish Department — 9268
Wyoming Livestock Board — 14820
Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785
Wyoming Stock Growers Assoc. — 14826, 15215, 15785
Wyoming Wildlife Federation — 14397, 14825, 14875, 14918
Yankton Sioux Tribe — 15846
Yell County Wildlife Federation — 7319

Brucellosis Risk Management (BI-52)
American Reform Party — CA — 4354
Animal Protection Institute — 11124
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Arizona Department of Agriculture — 12033
Assiniboine Tribe — 17724
Audubon Society, Montana Chapter — 14568
Cabinet Resource Group — 14600
Colville Confederated Tribes — 6990
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Defenders of Wildlife — 14980
Ecology Center — 15150, 15671
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Friends of the Wild Swan — 15237
Fund for Animals — 15123, 15197a
Georgia Department of Agriculture — 11108
Greater Yellowstone Coalition — 15126, 15420
Hagenbarth Livestock — 10638
Heartwood. See Preserve Appalachian Wilderness — 15372
Honor the Earth — 4490
Humane Society of the United States — 15129
Humane Society, Tampa Bay — 6881
InterTribal Bison Cooperative — 14484
Jackson Hole Conservation Alliance — 15124a, 15329
Last Chance for Animals. See Schubert & Associates — 10110
Montana Stockgrowers Association — 14832, 14833
Montana Tribal Fish and Wildlife Commission — 15363
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819, 15083, 15142
Nez Perce Tribal Executive Committee — 11409a
Northern Rockies Preservation Project — 5064
Patino-Treat and Rosen, Attorneys at Law — 9144
Predator Project — 15332
Preserve Appalachian Wilderness — 15372
Schubert & Associates — 10110, 14714
Shoshone-Bannock Tribes — 17741
Sierra Club, East Idaho Group — 14877
Sinapu — 14540
SPCA, Animal Care and Welfare — 256
Taylor, John A., Attorney at Law — 11486
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Voice for Wildlife — 11490
Wild Rockies InfoNet — 15545
Wilderness Society — 14909
Wildlands Center for Preventing Roads — 15354
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming State Governor — 14448
Wyoming Wildlife Federation — 14825, 14875, 14918, 15127
Yell County Wildlife Federation — 7319

Land Acquisitions/Easements or Winter Range (BI-34)
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Allen, Jack, Attorney at Law — 11097
Alpine Environmental, Inc. — 9079
Andersons Arsenal — 2563

Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 17726
Audubon Society, Alabama Council — 9740
Audubon Society, Boulder County — 1476
Audubon Society, Conococheague — 4105
Audubon Society, Last Chance — 8879
Backyard Designs — 1434
Baker Animal Hospital — 8926
Baldwin Realty — 705
Bear Creek Council — 8871
Berlin United Methodist Church — 1625
Big Horn Livestock Association — 14841
Bridging the Gap — 2116
Bruce Jackson Photography — 3795
C. W. Roders Enterprises — 3022
Cabinet Resource Group — 14600
California, County of Sacramento — 10336
Cefali and Cefali Attorneys at Law — 1690
Civitas — 14226
Coffee Shaman — 794
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Alliance — 6045
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee for Responsible Growth — 6057
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735, 9371
Confederated Tribes of the Yakama Indian Nation — 11029
Conservation Council for Hawaii — 15886
Converse County School District #2 — 17684
Cornelia Connelly School — 4216
Crabtree Ridge Farm — 16577
Daniel C. Hughes, Jr., Investment Properties — 10240
Doris Day Animal League — 14383
Double Spear Ranch — 9063
EB3 Ranch — 1722
Ecology Center — 15671
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
First Alabama Bank of Birmingham — 262
First Congregational Church — 1298
Florida Wildlife Organization — 14915
Friends of the Bitterroot — 8639
Fund for Animals — 15124
Gallatin Wildlife Association — 14935, 15233
Georgia Surgical Associates, P.C. — 6623
Girl Scout Troop 395 — 6831
Glasgow Area Chamber of Commerce and Agriculture — 2029
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition — 14941, 15126, 15239, 15420
Heartland Realty Investors, Inc. — 8320
Heartwood. See Preserve Appalachian Wilderness — 15372
Herbst Lazy TY Cattle Co. — 17856
Honor the Earth — 4490
Humane Education Network — 11441
Humane Society of the United States — 15129
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
Indiana Wildlife Federation — 5576
Inherit the Earth — 1923
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 14484, 14838
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Jackson Hole Conservation Alliance — 15124a
Kelly, Hart and Hallman — 8158
Kettle Range Conservation Group — 9328
Kokopelli Books — 3339
Lake Area Hamilton Stores — 6332
Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Light Touch Chiropractic — 5682
Livestock Conservation Institute — 9686
Lockwood Properties Trust — 9649
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Manitoba Animal Alliance — 150
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Michigan United Conservation Clubs — 8843
Microban Products Company — 7014
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Mississippi Wildlife Federation — 10645
Montana Farm Bureau Federation — 14834, 14836, 15147, 15242
Montana Stockgrowers Association — 14832, 14833, 14847, 14878, 15160, 15246
Montana Wildlife Federation — 15234
Mundt and Associates — 760

National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913, 15196a, 15367
National Wildlife Federation — 14819, 15245
Native Forest Network — 4102
New Jersey Animal Rights Alliance — 11137
New Jersey Veterans Memorial Home — 2548
Nez Perce Tribal Executive Committee — 11409a
Northern Rockies Preservation Project — 5064
Northwest BuildNet, Internet Marketing — 16852
Oglala Lakota College — 14408
Oregon Natural Resources Council — 2775
Peter H. Dierlich Associates — 3282
Prairie Island Tribal Council — 15812
Preserve Appalachian Wilderness — 15372, 9058
Purdy Ranches — 10100
Raven Trails — 1303
River Bend Ranch — 4868
Rocky Mountain Animal Defense — 14700, 14920, 14921
Russell Lamb Photography — 4495
Safari Club International — 8810
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
SEIEN (Southeast Idaho Environmental Network) — 1211
Sierra Club, Berks Group — 297
Sierra Club, Black Hills Group — 15199
Sierra Club, Minnesota — 15296
Sierra Club, North Star Chapter — 15843
Sierra Club, Texas Lone Star Chapter — 15094
Sinapu — 14540, 14928
Snider Hardwoods — 5120
Southeast Montana Sportsman Association — 14855
Spiriti Heart Productions — 15305
Star Watcher Productions — 6708
Stuyvesant High School, American Habitat Club — 8592
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Creek Ranch — 1236
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
Utah Wildlife Federation — 9301
Van Hyning and Associates, Inc. — 7484
Wade Gallery — 9858
Wild Birds Unlimited — 12059
Wild Rockies InfoNet — 15545
Wilderness Society — 15209a
Wildlife Management Institute — 5455
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
WPKR and WPCK Radio — 887
Wyoming Game and Fish Department — 9268
Wyoming Stock Growers Assoc. — 15215
Wyoming Wildlife Federation — 14397, 14875, 15127
Yeates, J. William, Attorney at Law — 9702
Yell County Wildlife Federation — 2521

Vegetation/Vegetative Communities (BI-43)

Apple Country Snowmobile Club — 9255
Blue Ribbon Coalition, Inc. — 14884
Civitas — 14226
Cody Conservation District Board — 14829
Fund for Animals — 15123
Gallatin Wildlife Association — 14935
Glasgow Area Chamber of Commerce and Agriculture — 2029
Greater Yellowstone Coalition — 15420
Hagenbarth Livestock — 10638
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Idaho State Governor — 11121
Livestock Conservation Institute — 9686
Meagher County News — 15377
Montana Farm Bureau Federation — 14834
Montana House of Representatives — 14851, 14857
Montana State Senate — 15316
Montana State University, Extension Range Management — 2919
Montana Stockgrowers Association — 14832, 14833, 14878, 14939, 15349
Oglala Lakota College — 15384
Preserve Appalachian Wilderness — 9058
Rocky Mountain Animal Defense — 14700
Safari Club International — 8810
Skyline Sportsmen's Association, Inc. — 639
Society for Range Management — 15723
Southeast Montana Sportsman Association — 14861
Utah Wildlife Federation — 9301
Washington State Snowmobile Association — 13452
Wildlife Management Institute — 5455
Wyoming Livestock Board — 14820
Wyoming Stock Growers Assoc. — 14854, 15122, 15128, 15215

Consultation and Coordination

New Alternatives/Issues (CC-4)

Animal Rights Alliance. See Schubert & Associates — 10110
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Defenders of Wildlife — 14980
Environmental Protection Agency — 14356
Farm Sanctuary. See Schubert & Associates — 10110
Greater Yellowstone Coalition — 15420
Honor the Earth — 4490
InterTribal Bison Cooperative — 14484, 17714
Last Chance for Animals. See Schubert & Associates — 10110
National Wildlife Federation — 14819
Schubert and Assoc. — 10110, 14714
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Utah Wildlife Federation — 9301
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (CC-31)

Confederated Salish and Kootenai Tribes of the Flathead Nation — 17715
Environmental Protection Agency — 14356
Greater Yellowstone Coalition — 14870
Shoshone-Bannock Tribes — 14775
Smith and Doherty, PLLC — 15368
Turner Foundation Inc. — 11514
Upper Sioux Community — 14701
Wyoming Division of Cultural Resources — 8778
Yankton Sioux Tribe — 15846

Cultural Resources

Archeology/Cultural Landscapes/Ethnography (CR-31)

American Indian Movement — 15297
Animal Rights Alliance. See Schubert & Associates — 10110
Assiniboine Tribe — 17708, 17724, 17726, 17727, 17728, 17729, 17730
Buffalo Gap Land Rescue — 14911
Cheyenne River Sioux Tribe — 15079, 15133a, 17720, 17751, 17752, 17753, 17754, 17755, 17756, 17758, 17759
Chippewa Cree Indians — 14837
Cody Conservation District Board — 14829
Colville Confederated Tribes — 6990
Commanche Caddo — 15112
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17715, 17735, 9371
Environmental Protection Agency — 14356
Farm Sanctuary. See Schubert & Associates — 10110
Florida Wildlife Organization — 14915
Gros Ventre Tribe — 17732
Ho-Chuck Nation — 17717
Honor the Earth — 4490
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
InterTribal Bison Cooperative — 14484, 14838, 15189a, 15271, 17712, 17714
Last Chance for Animals. See Schubert & Associates — 10110
Lower Sioux Indian Community — 15811
Minnesota Chippewa Tribe — 10349
Montana State Senate — 15316
Montana Tribal Fish and Wildlife Commission — 15363
National Wildlife Federation — 14819, 14890
New Jersey Environmental Lobby — 1739
Nez Perce Tribal Executive Committee — 11409a
Northern Cheyenne Tribe — 14839, 14852, 15667
Oglala Lakota College — 14408, 15384
Oglala Sioux Tribe — 15258, 17757, 4018
Prairie Band of Potawatomi Nation — 17710
Sacred Earth Network — 9359
Saginaw Chippewa Tribe — 15090
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
Selah Bamberger Ranch — 4037
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 14775, 17740, 17741, 17742, 17745, 17746
Smith and Doherty, PLLC — 15368
St. Labre — 13330
St. Labre Volunteers — 11096
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
Upper Sioux Community — 14701
Wild Rockies InfoNet — 15545
Wildlands Center for Preventing Roads — 15354

Winnebago Tribe of Nebraska — 14563, 17709
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Division of Cultural Resources — 8778
Yankton Sioux Tribe — 15846, 17718

Human Health

New Alternatives/Issues (HH-4)

Alabama Farmers Federation — 9948
American Farm Bureau Federation — 13356
Arizona Department of Agriculture — 12033
Idaho State Governor — 11121
Kansas Animal Health Department-Livestock Commission — 8455
Montana House of Representatives — 14857
Montana Stockgrowers Association — 14853
National Cattlemen's Beef Association — 11138
National Wildlife Federation — 15131

Brucellosis Transmission and Public Perception (HH-24)

Animal Rights Alliance. See Schubert & Associates — 10110
California Dept of Food and Agriculture — 9243
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Farm Sanctuary. See Schubert & Associates — 10110
Greater Yellowstone Coalition — 15420
Idaho Farm Bureau Federation — 11433
Illinois Department of Agriculture — 9446
Kansas Animal Health Department-Livestock Commission — 8455
Last Chance for Animals. See Schubert & Associates — 10110
Minnesota Board of Animal Health — 8993
National Wildlife Federation — 14819, 14923, 15245
Patino-Treat and Rosen, Attorneys at Law — 9144
Schubert & Associates — 10110, 14714
South Dakota Animal Industry Board — 9102
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
University of California, Cooperative Extension — 9122
Utah Farm Bureau Federation — 15780
Vermont Department of Agriculture, Food and Markets — 7485
Wisconsin Department of Agriculture, Trade and Consumer Protection — 11531
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (HH-31)

Cheyenne River Sioux Tribe — 17753, 17758
Nez Perce Tribal Executive Committee — 11409a

Livestock Operations

Public Grazing Allotments — Modify (LO-28)

Adventurer Tours — 13442
Alliance for the Wild Rockies — 8616
Alpine Environmental, Inc. — 9079
American Lands Alliance — 3037
American Reform Party — CA — 4354
Andersons Arsenal — 2563
Animal Protection Institute — 11124, 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Arlington Conservation Council — 7052
Artistic Features Art Studio — 6152
Assiniboine Tribe — 14850
Association of Veterinarians for Animal Rights — 2653
Audubon Society, Montana Chapter — 14568
Audubon Society, Evergreen Naturalists — 15572
Ayurvedic Rehabilitation Center — 753
Backyard Designs — 1434
Baldwin Realty — 705
Bridging the Gap — 2116
C. W. Roders Enterprises — 3022
Cabinet Resource Group — 14600
California Federation for Animal Legislation — 336
Chippewa Cree Indians — 14837
Civitas – 14226
Cody Conservation District Board — 14829
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee for Responsible Growth — 6057
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498

Concerned People for Animals, Inc. — 1080
Confederated Salish and Kootenai Tribes of the Flathead Nation — 9371
Conservation Council for Hawaii — 15886
Deerlodge Forest Defense Fund — 13055
Defenders of Wildlife — 14980
Diamond K Outfitters, Inc. — 10722
Doris Day Animal League — 14383
Earth Island Institute -15799
East Ascension Sportsmans League Inc. — 14737
Ecological Consulting Services — 13073
Ecology Center — 15150, 15671
Edmonds Institute — 15517
Environmental Council of Rhode Island — 16339
Environmental Protection Information Center — 14337
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
First Congregational Church — 1298
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Friends of Animals — 419
Friends of Animals and Their Environment and Faith — 15270
Friends of the Bitterroot — 8639
Friends of the Wild Swan — 15237
Fund for Animals — 15124, 15197a
Gallatin Wildlife Association — 14935, 15233
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 15239, 15420
Hakansson, Carl G., Attorney at Law — 1905
Haney Truck Line, Inc. — 9030
Heartwood. See Preserve Appalachian Wilderness — 15372
Honor the Earth — 4490
Humane Education Network — 11441, 473
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
Humane Society, Seneca County — 9062
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Indiana Wildlife Federation — 5576
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
Inherit the Earth — 1923
InterTribal Bison Cooperative — 14484, 14838, 15240, 15290
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Kaniksu Bioregional Council — 5168
Kelly, Hart and Hallman — 8158
Kettle Range Conservation Group — 10524, 9328
Kokopelli Books — 3339
LaCrosse Associates — 13033a
Lake Area Hamilton Stores — 6332
Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Light Touch Chiropractic — 5682
Livestock Conservation Institute — 9686
Lortz Manufacturing Company — 2861
Manitoba Animal Alliance — 150
Meagher County Sportman Association — 15674
Metrics Unlimited Inc. — 3087
Minnesota Conservation Federation — 10495
Montana Ecosystems Defense Council — 15165, 9592
Montana House of Representatives — 14857, 8872
Montana Stockgrowers Association — 15160, 15246
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wilderness Association — 15257
Montana Wildlife Federation — 15234, 15250
Morgan, Franich, Fredkin, and Marsh — 5989
Moseley Outdoor Advertising — 7674
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819, 14827, 15083, 15245
Natural Resources Defense Council — 15803
Nez Perce Tribal Executive Committee — 11409a
North Fork Preservation Association — 8383
Northern Rockies Preservation Project — 5064
Northwest Indiana Association of Wholistic Healers — 3535
Oglala Lakota College — 14408, 15384
Ohio Environmental Council — 2697, 446
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14920, 14921
Russell Lamb Photography — 4495

Sacred Earth Network — 9359
Santee Cooper — 15870d
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 17741, 17745, 17747
Sierra Club, Berks Group — 297
Sierra Club, Black Hills Group — 15199
Sierra Club, Minnesota — 15296
Sierra Club, Minnesota — 15296
Sierra Club, Minnesota — 15296
Sierra Club, Placer Group — 9825
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Texas Lone Star Chapter — 15094
Silver Cloud Farm — 8110
Sinapu — 14540, 14928
Southeast Montana Sportsman Association — 14855, 14861
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
Spiriti Heart Productions — 15305
St. Labre Volunteers — 11096
State of Utah Department of Agriculture and Food — 15781
Texas Animals — 15074
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
United States Animal Health Association — 9364
Utah Department of Agriculture and Food — 14887
Utah Wildlife Federation — 9301
Van Hyning and Associates, Inc. — 7484
Washington Wildlife Federation — 4538
Wild Rockies InfoNet — 15545
Wilderness Society — 14909, 15209a
Wildlands Center for Preventing Roads — 15354
Wildlife Damage Review — 7555
Wildlife Management Institute — 5455
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
WPKR and WPCK Radio — 887
Wyoming Farm Bureau Federation — 14889
Wyoming Stock Growers Assoc. — 15215
Wyoming Wildlife Federation — 14397, 14825, 14875, 14918, 15127
Wyoming Wildlife Federation — 15127
Yell County Wildlife Federation — 2521, 7319

Cattle — Brucellosis Class-Free Status (LO-25)
American Farm Bureau Federation — 13356
American Veterinary Medical Association — 8846
Animal Protection Institute — 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Big Horn Livestock Association — 14841
Blue Ribbon Coalition, Inc. — 14884
California Farm Bureau Federation — 15806
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Cody Conservation District Board — 14829
Defenders of Wildlife — 14980
Ecology Center — 15671
Environmental Protection Agency — 14356
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Fund for Animals — 15124
Greater Yellowstone Coalition — 14870, 15420
H. F. Magnuson Company — 458
Hagenbarth Livestock — 10638
Heartwood. See Preserve Appalachian Wilderness — 15372
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Indiana State Board of Animal Health — 9361
InterTribal Bison Cooperative — 14484
Kansas Animal Health Department-Livestock Commission — 8455
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Louisiana Department of Agriculture and Forestry — 9020
Louisiana Farm Bureau Federation, Inc. — 14293
Montana Farm Bureau Federation — 14834, 14836, 15147, 15242
Montana State Senate — 940
Montana Stockgrowers Association — 14847, 15246
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wildlife Federation — 15234
National Wildlife Federation — 14819, 14874
Nez Perce Tribal Executive Committee — 11409a
North Dakota Department of Agriculture, Board of Animal Health — 8440
Oregon Cattlemen's Association — 15669
Preserve Appalachian Wilderness — 15372

Rocky Mountain Animal Defense — 14700, 14920
Schubert & Associates — 10110, 14714
Shakopee Mdewakanton Sioux Community — 8827
Sinapu — 14540
Southeast Montana Sportsman Association — 14861
Southeastern Livestock Association — 14848
Texas Animal Health Commission — 9317
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
Vermont Department of Agriculture, Food and Markets — 7485
Washington Department of Agriculture — 10399
Wildlife Rehabilitation and Refuge Center — 374
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14889

Cattle Vaccination (LO-30)
Alliance for the Wild Rockies — 8616
American Association of Wildlife Veterinarians — 5638
Andersons Arsenal — 2563
Animal Protection Institute — 11124, 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Arlington Conservation Council — 7052
Audubon Society, Montana Chapter — 14568
Audubon Society, Bexar — 7059
Audubon Society, Last Chance — 8879
Audubon Society, Prairie Wood — 8200
Backyard Designs — 1434
Baker Animal Hospital — 8926
Big Horn Livestock Association — 14841
Buffalo Nations — 15187
C. W. Roders Enterprises — 3022
Cabinet Resource Group — 14600
Cheyenne River Sioux Tribe — 17758
Civitas — 14226
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Responsible Growth — 6057
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Concerned People for Animals, Inc. — 1080
Confederated Tribes of the Yakama Indian Nation — 11029
Cornelia Connelly School — 4216
Daniel C. Hughes, Jr., Investment Properties — 10240
Deerlodge Forest Defense Fund — 13055
Defenders of Wildlife — 14980
Diamond K Outfitters, Inc. — 10722
Doris Day Animal League — 14383
Double Spear Ranch — 9063
Earth Island Institute — 15799
East Ascension Sportsmans League Inc. — 14737
EB3 Ranch — 1722
Edmonds Institute — 15517
Environmental Protection Agency — 14356
Environmental Protection Information Center — 14337
Ethics Outreach — 8664
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
Flathead Wildlife — 10816
Florida Wildlife Organization — 14915
Friends of Animals — 419
Friends of Animals and Their Environment and Faith — 15270
Friends of the Bitterroot — 8639
Friends of the Wild Swan — 15237
Fund for Animals — 15124
Gallatin Wildlife Association — 15233
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 15126, 15420
Hakansson, Carl G., Attorney at Law — 1905
Heartland Realty Investors, Inc. — 8320
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441, 473
Humane Society, Tampa Bay — 6881
Idaho Watersheds Project — 15317
Indian Counseling Center — 9757
Indian Summer Festivals Inc. — 9877
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
InterTribal Bison Cooperative — 14484, 14838
Izaak Walton League — 15263, 15304
Jessie M. Harris, Flower and Nature Photography — 7373
Kaniksu Bioregional Council — 5168
Kettle Range Conservation Group — 9328
LaCrosse Associates — 13033a
Lake Area Hamilton Stores — 6332

Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Lichtenfeld, Mark, Attorney at Law — 751
Lortz Manufacturing Company — 2861
Lower Brule Community College — 11453
Lower Brule Community College — 12050
Lower Brule Sioux Tribe — 9107, 9108
Manitoba Animal Alliance — 150
Maryland Coalition for Animal Rights — 11529
Meagher County Sportman Association — 15674
Mennen Environmental Foundation — 6846
Metrics Unlimited Inc. — 3087
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Chippewa Tribe — 10349
Minnesota State, Indian Affairs Council — 10031
Montana House of Representatives — 14851
Montana State Senate — 15316
National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819, 15245
Nez Perce Tribal Executive Committee — 11409a
North Fork Preservation Association — 8383
Northern Rockies Preservation Project — 5064
Oglala Lakota College — 15384
Ohio Environmental Council — 446
Portneuf Environmental Council — 13111
Prairie Island Tribal Council — 15812
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Purdy Ranches — 10100
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
River Bend Ranch — 4868
Rocky Mountain Animal Defense — 14700, 14920
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 14775
Sierra Club — 15804
Sierra Club, Big River Group — 8850
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Delta Group of San Francisco — 11018
Sierra Club, East Idaho Group — 14877
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Rocky Mountain Chapter — 15726
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540
Southeast Montana Sportsman Association — 14855
SPCA, Animal Care and Welfare — 256
SPCA, League for Animal Protection, Inc. — 2549
Texas Animals — 15074
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Creek Ranch — 1236
Trout Unlimited, Rio Grande Chapter — 9369
Utah Wildlife Federation — 9301
Van Hyning and Associates, Inc. — 7484
Wade Gallery — 9858
Western Wildlife Health Cooperative — 4433
Wild Birds Unlimited — 12059
Wildlands Center for Preventing Roads — 15354
Wildlife Society — 14309
Wisdom House — 1033
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Stock Growers Assoc. — 15128
Wyoming Wildlife Federation — 14397, 14825, 14875, 15127

NEPA

New Alternatives/Issues (NE-4)

Alabama Department of Agriculture and Industries — 9839
American Council of Snowmobile Associations. See Moore and McFadden, Chartered — 14978
Animal Rights Alliance. See Schubert & Associates — 10110
Cabinet Resource Group — 14600
Cheyenne River Sioux Tribe — 17755
Cold Mountain, Cold Rivers — 15366
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110

Confederated Salish and Kootenai Tribes of the Flathead Nation — 9371
Defenders of Wildlife — 14980
Ecology Center — 15671
Environmental Protection Agency — 14356
Farm Sanctuary. See Schubert & Associates — 10110
Greater Yellowstone Coalition — 15420
Idaho Cattle Association — 11160
Idaho Farm Bureau Federation — 11433
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Jackson Hole Conservation Alliance — 15329
Last Chance for Animals. See Schubert & Associates — 10110
Montana Farm Bureau Federation — 14816
Montana State Senate — 15316
Montana Tribal Fish and Wildlife Commission — 15363
Moore and McFadden, Chartered — 14978
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819
Native Forest Network — 4102
Nez Perce Tribal Executive Committee — 11409a
Northern Rockies Preservation Project — 5064
Oglala Sioux Tribe — 4018
Predator Project — 15332
Rocky Mountain Animal Defense — 14700
Schubert & Associates — 10110, 14714
Shoshone-Bannock Tribes — 14775
Sinapu — 14540
Smith and Doherty, PLLC — 15368
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Town of West Yellowstone, Montana. See Moore and McFadden, Chartered — 14978
Trout Unlimited, Rio Grande Chapter — 9369
United States Animal Health Association — 9364
Vermont Department of Agriculture, Food and Markets — 7485
Washington Department of Agriculture — 10399
Wild Rockies InfoNet — 15545
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Wildlife Federation — 14397
Yankton Sioux Tribe — 15846
Yell County Wildlife Federation — 7319

Bison Effects on Free-Ranging Status and Distribution (NE-9)
Kettle Range Conservation Group — 10524

Brucellosis Transmission and Public Perception (NE-24)
Defenders of Wildlife — 14980
National Wildlife Federation — 14819
Yell County Wildlife Federation — 7319

Objectives and Constraints

New Alternatives/Issues (OC-4)
Animal Rights Alliance. See Schubert & Associates — 10110
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Defenders of Wildlife — 14980
Farm Sanctuary. See Schubert & Associates — 10110
Georgia Department of Agriculture — 9000
Greater Yellowstone Coalition — 15420
Last Chance for Animals. See Schubert & Associates — 10110
Montana State Senate — 15316
Nez Perce Tribal Executive Committee — 11409a
Raven Trails — 1303
Rocky Mountain Animal Defense — 14700
Schubert & Associates — 10110, 14714
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
Wildlife Management Institute — 5455
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110

Objectives and Constraints: Legal and Policy Mandates — Management Authority (OC-32)
Abrahams, Loewenstein, Bushman and Kauffman — 3910
Alabama Cattlemen's Association — 9729
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Alpine Environmental, Inc. — 9079
American Legion, Miami Beach No.85 — 2690
Animal Protection Institute — 11124
Animal Rights Alliance. See Schubert & Associates — 10110
Arlington Conservation Council — 7052

Assiniboine Tribe — 17708, 17726, 17728, 17729, 17730
Association of Veterinarians for Animal Rights — 2653
Audio Press — 14438
Audubon Society, Alabama Council — 9740
Audubon Society, Montana Chapter — 14568
Audubon Society, Bexar — 7059
Audubon Society, Boulder County — 1476
Audubon Society, Conococheague — 4105
Audubon Society, Prairie Wood — 8200
Ayurvedic Rehabilitation Center — 753
Bear Creek Council — 8871
Berlin United Methodist Church — 1625
Billings Rod and Gun Club — 14867
Bruce Jackson Photography — 3795
Buffalo Gap Land Rescue — 14911
Buffalo Nations — 14900
California Dept of Food and Agriculture — 9243
California, County of Sacramento — 10336
Cefali and Cefali Attorneys at Law — 1690
Cheyenne River Sioux Tribe — 15079, 17720, 17754, 17755, 17758, 17759
Chippewa Cree Indians — 14837
City Living Realtors — 7858
Civitas — 14226
Coffee Shaman — 794
Cold Mountain, Cold Rivers — 15366
Colorado Wildlife Alliance — 6045
Colorado Wildlife Federation — 9288
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17715, 17736, 17737, 17738, 17739, 9371
Conservation Council for Hawaii — 15886
Conservation Council for Hawaii — 5015
Crow Tribe — 17711, 17716
D. Lindsay Pettus Real Estate — 7034
David L. Bourgoin Law Offices — 4104
Dawson Medical Group — 4408
Defenders of Wildlife — 14980
Direct Response — 3822
East Ascension Sportsmans League Inc. — 14737
Ecology Center — 15150, 15254, 15671
EcoSys Alert — 1287
Edmonds Institute — 15517
Environmental Protection Agency — 14356
Environmental Protection Information Center — 14337
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
Flandreau Santee Sioux Tribe — 194
Flathead Wildlife — 10816
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Friends of Animals — 5937
Friends of Animals and Their Environment and Faith — 15270
Friends of the Bitterroot — 8639
Friends of the West — 191
Fund for Animals — 15123, 15124
Gallatin Wildlife Association — 14935, 15233
Georgia Surgical Associates, P.C. — 6623
Girl Scout Troop 395 — 6831
Greater Yellowstone Coalition — 14870, 15126, 15420
Gros Ventre Tribe — 17732
H. F. Magnuson Company — 458
Hagenbarth Livestock — 10638
Hakansson, Carl G., Attorney at Law — 1905
Haney Truck Line, Inc. — 9030, 9031
Hogue's Ravenoak — 10715
Honor the Earth — 4490
Humane Education Network — 473
Humane Society of the United States — 15129
Humane Society, Seneca County — 9062
Idaho Cattle Association — 11160
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Idaho Wildlife Federation of Boise — 14871
Indiana Wildlife Federation — 5576
Indigenous Support Coalition of Oregon — 15318
Indigo Girls — 14205
International Defenders of Animals, Inc. — 6283
International Lutheran Women's Missionary League — 1113
InterTribal Bison Cooperative — 14484, 15290, 17714
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Jackson Hole Conservation Alliance — 15124a, 15329
Kaniksu Bioregional Council — 5168
Kettle Range Conservation Group — 10524, 9328
Kokopelli Books — 3339
Last Chance for Animals. See Schubert & Associates — 10110
League of Kentucky Sportsmen, Inc. — 9153
Leonard, Street and Deinard — 9801
Lichtenfeld, Mark, Attorney at Law — 751

Livestock Conservation Institute — 9686
Lockwood Properties Trust — 9649
Manitoba Animal Alliance — 150
Mariposa Mobile Veterinary Service — 15729
Meagher County News — 15377
Meagher County Sportman Association — 15674
Michigan United Conservation Clubs — 8843
Microban Products Company — 7014
Minnesota Chippewa Tribe — 10349
Minnesota Conservation Federation — 10495
Mississippi Wildlife Federation — 10645
Montana Ecosystems Defense Council — 15165
Montana Farm Bureau Federation — 14816, 14836, 15147
Montana House of Representatives — 15668, 8872
Montana International Incorporated — 15252
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316
Montana Stockgrowers Association — 14878, 15246, 15349
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wildlife Federation — 15234, 15250
Moseley Outdoor Advertising — 7674
Mundt and Associates — 760
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 14913, 15196a, 15367
National Wildlife Federation — 14819, 14827, 14846, 14874, 14923, 15083, 15131, 15142, 15188a, 15245, 15262
Native Forest Network — 4102
Natural Resources Defense Council — 15803
Nevada Department of Business and Industry, Division of Agriculture — 7526
New Jersey Environmental Lobby — 1739
New Jersey Veterans Memorial Home — 2548
Nez Perce Tribal Executive Committee — 11409a
North American Bison Society — 1754
North Central Ohio Nature Preservation League — 281, 3288
North Fork Preservation Association — 8383
Northern Cheyenne Tribe — 14852
Northern Rockies Preservation Project — 5064
Northfork Ranch — 2530
Northwest BuildNet, Internet Marketing — 16852
Oglala Lakota College — 14408
Oglala Sioux Tribe — 15258, 4018
Ohio Environmental Council — 2697
Oregon Department of Agriculture — 14362
Oregon Natural Resources Council — 2775
Pain Relief Center — 9543
People for the USA — 13483
Peter H. Dierlich Associates — 3282
Portneuf Environmental Council — 13111
Prairie Band of Potawatomi Nation — 17710
Prairie Island Tribal Council — 15812
Predator Project — 15332
Purdy Ranches — 10100
Quality Transportation Services — 3016
Rancho San Benito — 5791
Raven Trails — 1303
Richard Raymond Associates — 14688
Rock Springs 4-H Center — 9656
Rocky Mountain Animal Defense — 14700, 14921
Rolyboh International, Inc. — 2768
Rosebud Sioux Tribe — 17721
Russell Lamb Photography — 4495
S.K.U.N.K.S — 16751
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
SEIEN (Southeast Idaho Environmental Network) — 1211
Seventh Generation Fund — 15565
Shoshone-Bannock Tribes — 14775, 17740, 17743, 17745, 17746
Sierra Club — 15804
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Central Florida Group — 3659
Sierra Club, Columbia Group, Oregon Chapter — 11424
Sierra Club, Delta Group of San Francisco — 11018
Sierra Club, East Idaho Group — 14877
Sierra Club, Minnesota — 15296
Sierra Club, Montana Chapter — 15172
Sierra Club, Montana, Idaho, and Wyoming Chapters — 14956
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Placer Group — 9825
Sierra Club, Rocky Mountain Chapter — 15726
Sierra Club, Texas Lone Star Chapter — 15094
Sierra Club, Wyoming Chapter — 15130
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540, 14928
Sisseton Wahpeton Sioux Tribe — 17713
Smith and Doherty, PLLC — 15368
Snider Hardwoods — 5120
South Carolina Wildlife Federation — 9668
Southeast Montana Sportsman Association — 14855, 14861

St. Labre — 13330
Station Middle School — 5187
Texas Animals — 15074
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trimbelle Rod and Gun Club — 10109
Trout Unlimited, Rio Grande Chapter — 9369
United Sioux Tribes — 17719
United States Animal Health Association — 9364
United States Senate, South Dakota — 17861
Upstream Anglers and Outdoor Adventures — 7749
Utah Wildlife Federation — 9301
Valley Middle School — 5191
Van Hyning and Associates, Inc. — 7484
Virginia 10th District Environmental Council — 11398
Virginia Wildlife Federation — 1946
Washington Cattlemen's Association — 14312
Washington Elementary School — 6th Grade — 17680
Washington Wildlife Federation — 16709, 4538
Washington Department of Agriculture — 10399
Western Wildlife Health Cooperative — 4433
Wild Rockies InfoNet — 15545
Wilderness Society — 14909, 14979, 15209a
Wildlife Management Institute — 5455
Wildlife Rehabilitation and Refuge Center — 374
Wildlife Society — 14309
William P. Cook and Associates, PLLC — 1081
Winnebago Tribe of Nebraska — 17709
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
WPKR and WPCK Radio — 887
Wyoming State Governor — 14448
Wyoming Stock Growers Assoc. — 15122, 15215
Wyoming Wildlife Federation — 14397, 14875, 14918, 15127
Yeates, J. William, Attorney at Law — 9702
Yell County Wildlife Federation — 7319

Socioeconomics

Benefit and Cost Impacts (SO-36)

American Farm Bureau Federation — 13356
American Reform Party — CA — 4354
Animal Protection Institute — 11124, 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Assiniboine Tribe — 17708, 17724, 17726, 17729, 17730
Blue Ribbon Coalition, Inc. — 7262
Cabinet Resource Group — 14600
California Dept of Food and Agriculture — 9243
Cody Conservation District Board — 14829
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Defenders of Wildlife — 14980
Ecology Center — 15671
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Fort Belknap Tribal Council — 17734
Greater Yellowstone Coalition — 15420
Hagenbarth Livestock — 10638
Haney Truck Line, Inc. — 9031
Herbst Lazy TY Cattle Co. — 17856
Humane Society, Seneca County — 9062
Idaho Farm Bureau Federation — 11433
Idaho Watersheds Project — 15317
Illinois Department of Agriculture — 9446
InterTribal Bison Cooperative — 17712
Jackson Hole Conservation Alliance — 15329
Kettle Range Conservation Group — 10524, 9328
Last Chance for Animals. See Schubert & Associates — 10110
League of Kentucky Sportsmen, Inc. — 9153
Livestock Conservation Institute — 9686
Montana Ecosystems Defense Council — 2820
Montana Farm Bureau Federation — 14816
Montana House of Representatives — 15668
Montana State Senate — 15316, 940
National Parks and Conservation Association — 14913
National Rifle Association — 2838
National Wildlife Federation — 14819
New Jersey Animal Rights Alliance — 11137
Nez Perce Tribal Executive Committee — 11409a
Portneuf Environmental Council — 13111
Prairie Band of Potawatomi Nation — 17710
Quality Transportation Services — 3016
Rocky Mountain Animal Defense — 14700, 14920
Rolyboh International, Inc. — 2768
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
Shoshone-Bannock Tribes — 17740, 17750
Sierra Club, North Star Chapter — 15843

Sierra Club, Yellowstone Ecosystem Task Force — 15890
Southeast Montana Sportsman Association — 14855
St. Labre — 13330
Station Middle School — 5187
Taylor, John A., Attorney at Law — 11486
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
United States Animal Health Association — 9364
Utah Farm Bureau Federation — 15780
Washington Department of Agriculture — 10399
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Stock Growers Assoc. — 14826, 15215
Wyoming Wildlife Federation — 14918
Yell County Wildlife Federation — 7319

Cost to Livestock Operators (SO-37)
American Reform Party — CA — 4354
Animal Protection Institute — 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Arizona Department of Agriculture — 12033
Assiniboine Tribe — 17726
Boocks Farm — 16778
Buffalo Nations — 15187
California Dept of Food and Agriculture — 9243
Civitas — 14226
Cody Conservation District Board — 14829
Commanche Caddo — 15112
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Deerlodge Forest Defense Fund — 13055
Defenders of Wildlife — 14980
Earth Island Institute — 15214a
Environmental Protection Information Center — 14337
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Friends of the Wild Swan — 15237
Gallatin Wildlife Association — 14935
Greater Yellowstone Coalition — 15126, 15420
Hagenbarth Livestock — 10638
Hakansson, Carl G., Attorney at Law — 1905
Heartwood. See Preserve Appalachian Wilderness — 15372
Herbst Lazy TY Cattle Co. — 17856
Humane Society of the United States — 15129
Idaho Cattle Association — 11160
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Illinois Department of Agriculture — 9446
InterTribal Bison Cooperative — 17712
Iowa Wildlife Federation, Inc. — 12035
Izaak Walton League — 15263, 15304
Kansas Animal Health Department-Livestock Commission — 8455
Kelly, Hart and Hallman — 8158
King Ranch — 8829
Kokopelli Books — 3339
Last Chance for Animals. See Schubert & Associates — 10110
Leonard, Street and Deinard — 9801
Louisiana Department of Agriculture and Forestry — 9020
Louisiana Farm Bureau Federation, Inc. — 14293
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Minnesota Board of Animal Health — 8993
Minnesota Chippewa Tribe — 10349
Montana Ecosystems Defense Council — 15165
Montana Farm Bureau Federation — 14816, 14834
Montana House of Representatives — 14857
Montana Livestock Ag Credit, Inc. — 2740
Montana Stockgrowers Association — 15160, 15241
Montana Tribal Fish and Wildlife Commission — 15363
National Parks and Conservation Association — 14913, 15196a
Natural Resources Defense Council — 15803
North Fork Preservation Association — 8383
Northern Rockies Preservation Project — 5064
Park County Ranchers Marketing Associates — 15183
Portneuf Environmental Council — 13111
Preserve Appalachian Wilderness — 15372, 9058
Rocky Mountain Animal Defense – 14921
Rolyboh International, Inc. — 2768
Schubert & Associates — 10110, 14714
Sinapu — 14540
Southeastern Livestock Association — 14848
Texas Establishment for Animal Rights. See Schubert & Associates — 10110

United States Animal Health Association — 9364
Utah Farm Bureau Federation — 15780
Utah Wildlife Federation — 9301
Washington Department of Agriculture — 10399
Wild Rockies InfoNet — 15545
Wilderness Society — 14909
Wildlife Management Institute — 5455
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642, 14889
Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785
Wyoming Stock Growers Assoc. — 14854, 15122, 15128, 15785

Minority and Low-Income Populations (SO-39)
Assiniboine Tribe — 17724, 17725, 17727
Cheyenne River Sioux Tribe — 17753, 17754, 17755
David L. Bourgoin Law Offices — 4104
Environmental Protection Agency — 14356
Fort Belknap Tribal Council — 17734
Montana Tribal Fish and Wildlife Commission — 15363
National Wildlife Federation — 14819
Nez Perce Tribal Executive Committee — 11409a
Oglala Sioux Tribe — 17757
Shoshone-Bannock Tribes — 17740
Turner Foundation Inc. — 11514
Winnebago Tribe of Nebraska — 17709

Nonmarket Values (SO-40)
Animal Rights Alliance. See Schubert & Associates — 10110
Assiniboine Tribe — 17708
Buffalo Nations — 14900
California Dept of Food and Agriculture — 9243
Cheyenne River Sioux Tribe — 17754
Cold Mountain, Cold Rivers — 15366
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17715
Ecology Center — 15671
Farm Sanctuary. See Schubert & Associates — 10110
Florida Wildlife Organization — 14915
Gallatin Wildlife Association — 14935
Greater Yellowstone Coalition — 15420
Haney Truck Line, Inc. — 9030
Idaho State Governor — 11121
Jackson Hole Conservation Alliance — 15329
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Montana Farm Bureau Federation — 15147
Montana State Senate — 15316
Montana Stockgrowers Association — 14832, 14878, 15241
Mt. Shasta Sno-Mobilers, Inc. — 11058
National Parks and Conservation Association — 14913
Prairie Band of Potawatomi Nation — 17710
Raven Trails — 1303
Rocky Mountain Animal Defense — 14700, 14920
Schubert & Associates — 10110, 14714
Sinapu — 14540
St. Labre — 13330
Taylor, John A., Attorney at Law — 11486
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Utah Farm Bureau Federation — 15780
Utah Snowmobile Association — 9050
Wilderness Society — 14909
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Wildlife Federation — 14875
Yell County Wildlife Federation — 7319
Yellowstone Arctic — Yamaha — 14501

Reasonable Project Costs (SO-41)
Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Allen, Jack, Attorney at Law — 11097
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Audubon Society, Alabama Council — 9740
Buffalo Nations — 14900, 15187
Cabinet Resource Group — 14600
Civitas — 14226
Cold Mountain, Cold Rivers — 15366
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Deerlodge Forest Defense Fund — 13055
Diamond K Outfitters, Inc. — 10722
Earth Island Institute — 15214a, 15799
Environmental Protection Information Center — 14337

Farm Sanctuary. See Schubert & Associates — 10110
Friends of the Wild Swan — 15237
Fund for Animals — 15124, 15197a
Gallatin Wildlife Association — 14935
Greater Yellowstone Coalition — 15239
Haney Truck Line, Inc. — 9031
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441, 473
Humane Society, Tampa Bay — 6881
Idaho State Governor — 11121
Indigo Girls — 14205
Keenan Ranch — 9111
Kettle Range Conservation Group — 10524
Kokopelli Books – 3339
LaCrosse Associates — 13033a
Last Chance for Animals. See Schubert & Associates — 10110
Michigan Department of Agriculture — 10509
Mills, Sherman, Gilliam, and Goodwin, P.S.C. — 6931
Montana Ecosystems Defense Council — 9592
Montana Farm Bureau Federation — 14834, 14836, 15147
Montana Stockgrowers Association — 15160
Montana Wilderness Association — 15257
National Parks and Conservation Association — 14913
National Wildlife Federation — 14890, 15131
New Jersey Animal Rights Alliance — 11137
Preserve Appalachian Wilderness — 15372
Raven Trails — 1303
Republicans for Environmental Protection — 14892
Richard Raymond Associates — 14688
Rocky Mountain Animal Defense — 14921
Santee Cooper — 15870d
Schubert & Associates — 10110, 14714
Seventh Generation Fund — 15565
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Wyoming Chapter — 15130
St. Labre Volunteers — 11096
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Virginia 10th District Environmental Council — 11398
Wild Rockies InfoNet — 15545
Wilderness Society — 14909
Wildlands Center for Preventing Roads — 15354
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Livestock Board — 14820
Wyoming Stock Growers Assoc. — 15122
Wyoming Wildlife Federation — 14875

Social Values (SO-42)

Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Alpine Environmental, Inc. — 9079
Animal Protection Institute — 11124
Architectural Illustration — 14368
Arlington Conservation Council — 7052
Assiniboine Tribe — 17708, 17723, 17724, 17726, 17727, 17728, 17729, 17730, 17731
Association of Veterinarians for Animal Rights — 2653
Audubon Society, Alabama Council — 9740
Audubon Society, Conococheague — 4105
Boesche, McDermott and Eskridge — 6201
Buffalo Gap Land Rescue — 14911
Cabinet Resource Group — 14600
California, County of Sacramento — 10336
Cheyenne River Sioux Tribe — 17754, 17758
City Living Realtors — 7858
Committee for Responsible Growth — 6057
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735
Coyote Creek Photography — 1786
Crow Tribe — 17716
D. Lindsay Pettus Real Estate — 7034
Doris Day Animal League — 14383
Earth Island Institute — 15799
Ecology Center — 15150, 15254
Family Medicine — 7755
Florida Wildlife Organization — 14915
Friends of Animals — 5937
Friends of Animals and Their Environment and Faith — 15270
Georgia Department of Agriculture — 9000
Girl Scout Troop 395 — 6831
Goldstar Jewellery Pvt. Ltd. — 4536
Greater Yellowstone Coalition — 15420
Ho-Chuck Nation — 17717
Honor the Earth — 4490
Humane Society, Marion County — 9678
Idaho State Governor — 11121
Idaho Watersheds Project — 15317
Inherit the Earth — 1923
Jackson Hole Conservation Alliance — 15329
Jerabek Elementary School — 5th Grade — 17872
League of Kentucky Sportsmen, Inc. — 9153
Lemon Bay High School — 11089
Maryland Coalition for Animal Rights — 11529

Meagher County News — 15377
Minnesota Chippewa Tribe — 10349
Mississippi Wildlife Federation — 10645
Montana House of Representatives — 8872
Montana State Senate — 15316
Montana Tribal Fish and Wildlife Commission — 15363
Montana Wildlife Federation — 15234
Morris, Manning and Martin — 1658
Moseley Outdoor Advertising — 7674
National Cattle and Feed Association — 15130
National Rifle Association Coalition — 15211a
National Wildlife Federation — 14819
New Jersey Environmental Lobby — 1739
North American Independent Indigenous Community — 13131
North Central Ohio Nature Preservation League — 281
Oglala Lakota College — 14408
Ohio Environmental Council — 2697
Peter H. Dierlich Associates — 3282
Rocky Mountain Animal Defense — 14700, 14920
Rolyboh International, Inc. — 2768
Sarasota In Defense of Animals — 11060
Selah Bamberger Ranch — 4037
Shoshone-Bannock Tribes — 14775, 17740, 17741, 17742, 17750
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Minnesota — 15296
Sierra Club, North Star Chapter — 15843
Silver Cloud Farm — 8110
Sinapu — 14540, 14928
South Carolina Wildlife Federation — 9668
Station Middle School — 5187
Stuyvesant High School, American Habitat Club — 8592
Taylor, John A., Attorney at Law — 11486
Texas Committee on Natural Resources — 15081
Thunder Nation — 15280
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
United States Animal Health Association — 9364
Upstream Anglers and Outdoor Adventures — 7749
Washington Wildlife Federation — 4538
Wilderness Society — 14909, 15209a
Wildlands Center for Preventing Roads — 15354
Wildlife Damage Review — 7555
Winnebago Tribe of Nebraska — 17709
WPKR and WPCK Radio — 887
Wyoming Wildlife Federation — 15127
Yankton Sioux Tribe — 17718
Yeates, J. William, Attorney at Law — 9702
Yell County Wildlife Federation — 2521

Visitor Use

Overall Visitor Use and Experience (VU-44)

Alabama Environmental Council. See Audubon Society, Alabama Council — 9740
Alabama Ornithological Society. See Audubon Society, Alabama Council — 9740
Alpine Environmental, Inc. — 9079
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Apple Country Snowmobile Club — 9255
Architectural Illustration — 14368
Assiniboine Tribe — 17726
Audubon Society, Alabama Council — 9740
Bruce Jackson Photography — 3795
California, County of Sacramento — 10336
Cheyenne River Sioux Tribe — 17758
Chipeta Elementary – 5192
City Living Realtors — 7858
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Farm Sanctuary. See Schubert & Associates — 10110
Florida Biodiversity Project — 9382
Florida Wildlife Organization — 14915
Girl Scout Troop 395 — 6831
Greater Yellowstone Coalition — 15420
Heartwood. See Preserve Appalachian Wilderness — 15372
Kokopelli Books — 3339
Last Chance for Animals. See Schubert & Associates — 10110
Montana International Incorporated — 15252
Montana State University, Extension Range Management — 2919
Morgan, Franich, Fredkin, and Marsh — 5989
Mt. Shasta Sno-Mobilers, Inc. — 11058
Pain Relief Center — 9543
People for the USA — 13483
Preserve Appalachian Wilderness — 15372
Schubert & Associates — 10110, 14714
Sierra Club, Bitterroot Mission Group — 13447
Sinapu — 14540
Taylor, John A., Attorney at Law — 11486
Texas Committee on Natural Resources — 15081
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Washington Wildlife Federation — 4538

Wildlands Center for Preventing Roads — 15354
Wildlife Management Institute — 5455
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Stock Growers Assoc. — 15128
Yeates, J. William, Attorney at Law — 9702
Yell County Wildlife Federation — 2521
Yellowstone Arctic — Yamaha — 14501

Winter Recreation (VU-45)

Allen, Jack, Attorney at Law — 11097
American Council of Snowmobile Associations. See Moore and McFadden, Chartered — 14978
Animal Protection Institute — 11124, 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Apple Country Snowmobile Club — 9255
Assiniboine Tribe — 17726
Association of Veterinarians for Animal Rights — 2653
Ayers Northwest — 9056
Ayurvedic Rehabilitation Center — 753
Blue Ribbon Coalition, Inc. — 7262, 14884
Butte Busters Snowmobile Club, Inc. — 9488
California Federation for Animal Legislation — 336
Cheyenne River Sioux Tribe — 17754
Civitas — 14226
Colorado Grizzly Project — 2555
Colville Confederated Tribes — 6990
Committee for Children — 420
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Compassionate Creations — 498
Concerned People for Animals, Inc. — 1080
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735, 9371
Cornelia Connelly School — 4216
Doris Day Animal League — 14383
Earth Island Institute — 15799
Ethics Outreach — 8664
Farm Sanctuary. See Schubert & Associates — 10110
Flandreau Santee Sioux Tribe — 194
Florida Biodiversity Project — 9382
Forest Lake Minnesota Snowmobile Club — 10305
Friends of Animals — 419, 5937
Friends of Animals and Their Environment and Faith — 15270
Fund for Animals — 15123, 15197a
Gallatin Wildlife Association — 15233
Grassroot for Multiple Use — 14285
Great Plains Restoration Council — 5515
Greater Yellowstone Coalition — 15420
Hakansson, Carl G., Attorney at Law — 1905
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441
Humane Society of the United States — 15129
Humane Society, Marion County — 9678
Humane Society, Seneca County — 9062
Idaho State Governor — 11121
Idaho State Snowmobile Association — 10491
Idaho Watersheds Project — 15317
International Defenders of Animals, Inc. — 6283
InterTribal Bison Cooperative — 14484, 14838
Izaak Walton League — 15263, 15304
Jack Atcheson and Sons, Inc. — 3627
Kelly, Hart and Hallman — 8158
Last Chance for Animals. See Schubert & Associates — 10110
Lichtenfeld, Mark, Attorney at Law — 751
Manitoba Animal Alliance — 150
Montana State Senate — 15316
Montana Tribal Fish and Wildlife Commission — 15363
Moore and McFadden, Chartered — 14978
Mt. Shasta Sno-Mobilers, Inc. — 11058, 9124
National Coalition for Public Lands and Natural Resources — 10316
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819
New Jersey Animal Rights Alliance — 11137
Nez Perce Tribal Executive Committee — 11409a
North American Bison Society — 1754
Ohio Environmental Council — 446
Pain Relief Center — 9543
Preserve Appalachian Wilderness — 15372
Raven Trails — 1303
Rocky Mountain Animal Defense — 14700, 14920, 14921
Russell Lamb Photography — 4495
Sarasota In Defense of Animals — 11060
Schubert & Associates — 10110, 14714
Seeley Lake Driftriders — 8638
Sierra Club — 10603
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540
SPCA, Animal Care and Welfare — 256
Stone Orchards — 9392

Texas Animals — 15074
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Town of West Yellowstone, Montana. See Moore and McFadden, Chartered — 14978
Utah Snowmobile Association — 9050
Utah Wildlife Federation — 9301
Valley SnoDrifters — 14277
Washington State Snowmobile Association — 13452
Wildlands Center for Preventing Roads — 15354
Wildlife Damage Review — 7555
Wildlife Rehabilitation and Refuge Center — 374
Wisdom House — 1033
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming State Governor — 14448
Yellowstone Arctic — Yamaha — 14501

Visual Resources

Landscapes and Viewsheds (VR-47)

Cody Conservation District Board — 14829
Montana Livestock Ag Credit, Inc. — 2740
Montana State University, Extension Range Management — 2919
Montana Stockgrowers Association — 14832
Nez Perce Tribal Executive Committee — 11409a
Rocky Mountain Animal Defense — 14700
Utah Snowmobile Association — 9050
Wild Rockies InfoNet — 15545

Wildlife

Brucellosis in Other Wild Ungulates (WI-21)

Adventurer Tours — 13442
Alabama Cooperative Extension System — 14431
Alabama Veterinary Medical Association — 14607
Alliance for the Wild Rockies — 8616
American Association of Wildlife Veterinarians — 5638
American Farm Bureau Federation — 13356
American Veterinary Medical Association — 8846
Animal Protection Institute — 15186a
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 17708, 17724, 17727
Audubon Society, Montana Chapter — 14568
Buffalo Nations — 14900
Cabinet Resource Group — 14600
California Dept of Food and Agriculture — 9243
Cheyenne River Sioux Tribe — 17720, 17758, 17759
Chippewa Cree Indians — 14837
Civitas — 14226
Cold Mountain, Cold Rivers — 15366
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Confederated Salish and Kootenai Tribes of the Flathead Nation — 17735, 9371
East Ascension Sportsmans League Inc. — 14737
Ecology Center — 15150, 15671
Environmental Protection Agency — 14356
Farm Sanctuary. See Schubert & Associates — 10110
FaunaWest Wildlife Consultants — 10656
Florida Biodiversity Project — 9382
Friends of Animals — 5937
Fund for Animals — 15124
Gallatin Wildlife Association — 14935
Geyser Gazette — 14367
Grassland Heritage Foundation — 9158
Greater Yellowstone Coalition — 15420
Hagenbarth Livestock — 10638
Heartwood. See Preserve Appalachian Wilderness — 15372
Humane Education Network — 11441
Idaho Cattle Association — 11160
Idaho Mythweaver — 14439
Idaho Wildlife Federation of Boise — 14871
Izaak Walton League — 15263, 15304
Jessie M. Harris, Flower and Nature Photography — 7373
Kansas Animal Health Department-Livestock Commission — 8455
Kettle Range Conservation Group — 10524
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Marshall Elementary School — 4th Grade — 17681
Montana Farm Bureau Federation — 14834
Montana House of Representatives — 8872
Montana State Senate — 15316
Montana Stockgrowers Association — 14878, 14939, 15241, 15349
Montana Tribal Fish and Wildlife Commission — 15363
National Bison Association — 9097

National Parks and Conservation Association — 14913, 15367
National Wildlife Federation — 14819, 14890, 14923
Nez Perce Tribal Executive Committee — 11409a
North American Independent Indigenous Community — 13131
Northern Rockies Preservation Project — 5064
Predator Project — 15332
Preserve Appalachian Wilderness — 15372, 9058
Purdy Ranches — 10100
Rocky Mountain Animal Defense — 14700, 14920
Schubert & Associates – 10110, 14714
Sierra Club, Mount Evans Group — 10156
Sierra Club, North Star Chapter — 15843
Sierra Club, Santa Lucia Chapter — 5432
Sierra Club, Yellowstone Ecosystem Task Force — 15890
South Carolina Wildlife Federation — 9668
Star B Ranch. See National Bison Association — 15187a
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
United States Animal Health Association — 9364
Upstream Anglers and Outdoor Adventures — 7749
Vermont Department of Agriculture, Food and Markets — 7485
Western Wildlife Health Cooperative — 4433
Wild Rockies InfoNet — 15545
Wilderness Society — 14909
Wildlife Management Institute — 5455
Wildlife Society — 14309
Winnebago Tribe of Nebraska — 17709
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642
Wyoming Livestock Board — 14820
Wyoming Outdoor Council. See Wyoming Stock Growers Association — 15785
Wyoming State Governor — 14448
Wyoming Stock Growers Assoc. — 15122, 15215, 15785
Wyoming Wildlife Federation — 14825, 14875
Yell County Wildlife Federation — 2521, 7319

Predators and Scavengers/Ungulates (WI-48)
American Association of Wildlife Veterinarians — 5638
Animal Rights Alliance. See Schubert & Associates — 10110
Appalachian Voices. See Preserve Appalachian Wilderness — 15372
Assiniboine Tribe — 17708
Cold Mountain, Cold Rivers — 15366
Colorado Grizzly Project — 2555
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Ecology Center — 15254, 15671
Family Medicine — 7755
Farm Sanctuary. See Schubert & Associates — 10110
Greater Yellowstone Coalition — 15420
Heartwood. See Preserve Appalachian Wilderness — 15372
Jackson Hole Conservation Alliance — 15329
Last Chance for Animals. See Schubert & Associates — 10110
Montana Livestock Ag Credit, Inc. — 2740
Montana State Senate — 15316
National Bison Association — 9097
National Rifle Association — 2838
National Wildlife Federation — 14819, 15188a
Predator Project — 15332
Preserve Appalachian Wilderness — 15372
Schubert & Associates — 10110, 14714
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Minnesota — 15296
Star B Ranch. See National Bison Association — 15187a
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
Utah Farm Bureau Federation — 15780
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Stock Growers Assoc. — 15215

Threatened and Endangered Species (WI-49)
American Farm Bureau Federation — 13356
Animal Rights Alliance. See Schubert & Associates — 10110
Audubon Society, Evergreen Naturalists — 15572
Banff Environmental Action and Res. (BEAR) Soc. — 2397a
Chipeta Elementary — 5192
Cold Mountain, Cold Rivers — 15366
Committee to Abolish the Fur Trade. See Schubert & Associates — 10110
Defenders of Wildlife — 14980
Ecology Center — 15671

Farm Sanctuary. See Schubert & Associates — 10110
Glasgow Area Chamber of Commerce and Agriculture — 2029
Greater Yellowstone Coalition — 15420
Idaho Mythweaver — 14439
Idaho State Governor — 11121
Indigo Girls — 14205
Jackson Hole Conservation Alliance — 15329
Last Chance for Animals. See Schubert & Associates — 10110
Livestock Conservation Institute — 9686
Montana Stockgrowers Association — 14833
National Bison Association — 9097
National Parks and Conservation Association — 15367
National Wildlife Federation — 14819
Predator Project — 15332
Schubert & Associates — 10110, 14714
Sierra Club, Bitterroot Mission Group — 13447
Sierra Club, Yellowstone Ecosystem Task Force — 15890
Sinapu — 14540
Star B Ranch. See National Bison Association — 15187a
Taylor, John A., Attorney at Law — 11486
Texas Establishment for Animal Rights. See Schubert & Associates — 10110
Trout Unlimited, Rio Grande Chapter — 9369
Turner Foundation Inc. — 11514
United States Animal Health Association — 9364
Upstream Anglers and Outdoor Adventures — 7749
Wild Rockies InfoNet — 15545
World Society for the Prevention of Cruelty to Animals. See Schubert & Associates — 10110
Wyoming Farm Bureau Federation — 14642

Contents

Alternatives

Adjustments to Interim Plan (AL-2) 3
- Issue 1: Include Specific Management Activities in Alternative 1 (Interim Plan)
- Issue 2: Analysis of Alternative 1 is Incomplete

Alternative Plan B (AL-54) 4
- Issue 1: Plan B for Bison

Alternatives/Issues Eliminated from Further Consideration (AL-3) 8
- Issue 1: Feeding Bison
- Issue 2: Fencing Bison or Controlling Distribution
- Issue 3: Sterilization of Bison

New Alternatives/Issues (AL-4) 11
- Issue 1: Objectivity of Science in the Environmental Impact Statement
- Issue 2: Scope of Analysis
- Issue 3: Cost-Effectiveness
- Issue 4: Alternatives to Reduce Risk Management
- Issue 5: Research
- Issue 6: Legality of Plan
- Issue 7: Wildness of the Herd
- Issue 8: Management Entities
- Issue 9: New Alternatives Similar to Others
- Issue 10: Completely New Alternatives
- Issue 11: Use of a Buffer Area
- Issue 12: A Bison Refuge
- Issue 13: Brucellosis Eradication in Yellowstone National Park vs. Other Areas

Bison Alternative (AL-55) 30
- Issue 1: The Bison Alternative

Citizens' Plan (AL-53) 33
- Issue 1: The Citizens' Plan

Bison

Capture/Test/Slaughter Operations (BI-5) 45
- Issue 1: Testing
- Issue 2: Capture Facilities
- Issue 3: Cessation of All Capture, Test, and Slaughter Operations
- Issue 4: Capture, Test, and Slaughter Operations
- Issue 5: Additional Analysis Needed or Inaccurate Analysis Presented

Definition of Low Risk (BI-6) 52
- Issue 1: Federal vs. State Definition of Low Risk
- Issue 2: When and Where Low-Risk Bison Should be Allowed Outside the Park
- Issue 3: Transmission by Certain Age/Sex Classes of Bison
- Issue 4: Low-Risk Bison and Testing
- Issue 5: Accept the Low-Risk Management Techniques of "Plan B"
- Issue 6: Zero Tolerance or Zero Risk
- Issue 7: Low-Risk Season

Distribution (Carcasses) (BI-7) 57
- Issue 1: Sale of Harvested Bison
- Issue 2: Distribution of Bison Carcasses to Native American Tribes

Issue 3: Research
Issue 4: Natural Processes

Distribution (Live) (BI-8) 59
Issue 1: Distribution of Live Bison to Native American Tribes, Public Lands or Private Entities
Issue 2: Selling Live Bison
Issue 3: Relocating Live Bison

Effects on Free-Ranging Status and Distribution (BI-9) 64
Issue 1: Allow Bison to Freely Roam on Public Lands
Issue 2: Bison Migration Routes
Issue 3: Quarantine Facilities
Issue 4: Historic Range
Issue 5: Bison Movement Related to Road Grooming
Issue 6: Miscellaneous Comments

Humane Treatment (BI-10) 70
Issue 1: Support for Specific Alternatives
Issue 2: Opposition to Specific Alternatives
Issue 3: Humane Treatment in Current Management Practices
Issue 4: Humane Treatment in Proposed Management Strategies
Issue 5: Additional Analysis, Corrections, Information
Issue 6: Animal Welfare, Animal Rights, and Related Concerns
Issue 7: General Concerns

Hunting (BI-11) 78
Issue 1: Oppose Hunting of Bison
Issue 2: Support Hunting
Issue 3: Limit the Use and Extent of Hunting
Issue 4: Ethics of Hunting
Issue 5: Effects of Hunting
Issue 6: Hunting in Yellowstone National Park
Issue 7: Corrections/Additional Analysis Needed
Issue 8: Miscellaneous
Issue 9: Specifics of Regulations, Timing, Duration, Numbers, Administration of Bison Hunt
Issue 10: Administration and Oversight of Hunting
Issue 11: Hunting Revenue

Population (BI-12) 90
Issue 1: Support/Opposition for Establishing a Population Maximum
Issue 2: Method for Choosing Population Range
Issue 3: Minimum Viable Population/Genetics
Issue 4: Suggested Maximum Population Size
Issue 5: Maintaining Population within Stated Objectives
Issue 6: Effects of Alternatives on Bison Population
Issue 7: Policy Questions
Issue 8: Objectives — Purpose in Setting Population Objectives
Issue 9: Additional Data/Analysis — Corrections

Property Damage (BI-14) 106
Issue 1: Property Damage That Has Occurred by Bison in Different Areas Surrounding Yellowstone National Park

Quarantine Operations (BI-15) 108
Issue 1: Purpose of a Quarantine Facility
Issue 3: Opposition to or Support of a Quarantine Facility
Issue 4: Design, Location, Funding and Operation of a Facility
Issue 4: New Alternatives
Issue 5: Necessity of a Quarantine Facility

Issue 6: Protocol Proposed for Bison
Issue 7: Animals Selected for Quarantine
Issue 8: Elk v. Bison Disease Management
Issue 9: Quarantine on Tribal Lands
Issue 10: Distribution of Live Bison

Ranching (BI-16) 120
Issue 1: Issues Related to Bison Ranching

Special Management Areas (BI-17) 122
Issue 1: A Large Special Management Area as Described in the Citizens' Plan
Issue 2: Private Lands for SMAs
Issue 3: Excluding Private Lands from SMAs
Issue 4: The Legality of Special Management Areas
Issue 5: The SMAs as a Way to Add Lands to Yellowstone National Park
Issue 6: Authority for the Management of Bison within SMAs
Issue 7: SMAs Do Not Contribute to the Resolution of Management Issues
Issue 8: SMAs Contribute to the Resolution of Management Issues
Issue 9: Management Programs or Actions within SMAs
Issue 10: Acceptability or Appropriateness of SMAs
Issue 11: Bison Use of Public Lands outside Yellowstone National Park

Special Management Areas — Authority to Manage (BI-18) 132
Issue 1: State Veterinarian's Authority for SMAs

Special Management Areas — Proposed Boundaries (BI-19) 133
Issue 1: Proposed Boundaries for Special Management Areas

Vaccination (BI-20) 137
Issue 1: Vaccinating Cattle vs. Bison
Issue 2: Other Uses for Money Spent on Vaccine Research
Issue 3: Opposition to Vaccinating Bison
Issue 4: Vaccination of Yellowstone Bison
Issue 5: Bison Vaccination As It Relates to Specific Alternatives
Issue 6: RB51
Issue 7: Strain 19
Issue 8: A Safe and Effective Vaccine
Issue 9: Which Bison Should be Vaccinated
Issue 10: Vaccine Delivery
Issue 11: Long-Term Vaccination
Issue 12: New Alternatives
Issue 13: Bison Vaccination as Part of a Program to Eliminate Brucellosis from the Yellowstone Bison Herd

Ecology (BI-51) 149
Issue 1: Role/Importance of Bison in the Ecosystem
Issue 2: Natural Biology, Behavior, Ecology of Bison
Issue 3: Ecosystem Health
Issue 4: Support/Opposition to Specific Alternatives
Issue 5: Impacts of Alternatives
Issue 6: Additional Analysis, Corrections, Omissions, etc.
Issue 7: Miscellaneous

Brucellosis in the Yellowstone Bison Herd (BI-22) 161
Issue 1: Eradicate Brucellosis in the Yellowstone Herd
Issue 2: Transmission between Bison and Cattle, Cattle and Bison
Issue 3: Brucellosis Effects on Bison
Issue 4: No Brucellosis Eradication from the Yellowstone Herd
Issue 5: Disease Prevalence in the Yellowstone Herd

Issue 6: Risk Management

Brucellosis Testing (BI-23) 168
Issue 1: Relationship of Testing to Lethal Control
Issue 2: Relationship of Testing to Quarantine
Issue 3: Tissue Testing
Issue 4: Blood Testing
Issue 5: Support for Testing
Issue 6: Opposition to Testing
Issue 7: Testing All Montana Cattle
Issue 8: Testing Cattle in the Conflict Zone
Issue 9: Testing and Brucellosis Eradication
Issue 10: Disposition of Seronegative Bison after Testing
Issue 11: Disposition of Seropositive Bison after Testing
Issue 12: Inaccurate Information in the *Draft Environmental Impact Statement*
Issue 13: Correlation between Brucellosis Serology and Culture
Issue 14: Miscellaneous Testing Issues

Brucellosis Transmission and Public Perception (BI-24) 180
Issue 1: Risk of Brucellosis Transmission from Bison to Cattle in the Area
Issue 2: Brucellosis Transmission from Bison to Cattle in the Wild
Issue 3: Approach to Brucellosis Management
Issue 4: Additional Needed Research
Issue 5: Brucellosis and Greater Yellowstone Area Elk
Issue 6: Original Source of Brucellosis
Issue 7: Brucellosis in Cattle
Issue 8: Brucellosis in Bison
Issue 9: Cattle-to-Cattle Transmission
Issue 10: Disease Control
Issue 11: Brucellosis Eradication
Issue 12: Brucellosis Transmission from Cattle to Bison
Issue 13: Brucellosis and Other Wildlife Species
Issue 14: Risk Analysis
Issue 15: DEIS Alternatives or Those Proposed by Others
Issue 16: Brucellosis Not a Disease Issue
Issue 17: Education on the Brucellosis Issue
Issue 18: Miscellaneous

Brucellosis Risk Management (BI-52) 214
Issue 1: Risk of Transmission
Issue 2: Risk of Transmission in the Wild
Issue 3: Information on Risks Used in the *Draft Environmental Impact Statement*
Issue 4: Genetic Resistance and Risk
Issue 5: Risk if Bison and Cattle are Kept Separate
Issue 6: Risk Associated with "Low Risk" Bison
Issue 7: Education
Issue 8: Risk Management vs. Elimination of Brucellosis

Land Acquisitions/Easements or Winter Range (BI-34) 220
Issue 1: Opposed to Land Acquisition/Easements
Issue 2: In Favor of Land Acquisition or Easement
Issue 3: Other Land Acquisition Comments

Vegetation/Vegetative Communities (BI-43) 227
Issue 1: Impacts of Bison, Other Wildlife, and Cattle Grazing on Plant Communities
Issue 2: Noxious Weeds
Issue 3: Carrying Capacity
Issue 4: Management

Consultation and Coordination

New Alternatives/Issues (CC-4) 233
- Issue 1: Coordinated Bison Management
- Issue 2: Public Debate or Consensus
- Issue 3: Scoping the EIS
- Issue 4: Draft EIS Review Period

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (CC-31) 236
- Issue 1: Government-to-Government Consultation
- Issue 2: Executive Order #13084
- Issue 3: National Historic Preservation Act, U.S. Constitution, American Religious Freedom Act

Cultural Resources

Archeology/Cultural Landscapes/Ethnography (CR-31) 239
- Issue 1: Visual or Scenic Impacts
- Issue 2: Traditional Cultural Property
- Issue 3: Landscapes and Viewsheds
- Issue 4: Religious Freedom
- Issue 5: Corrections/Revisions

Human Health

New Alternatives/Issues (HH-4) 247
- Issue 1: Human Safety

Brucellosis Testing (HH-23) 248
- Issue 1: Testing Cattle to Protect Human Health

Brucellosis Transmission and Public Perception (HH-24) 249
- Issue 1: The Risk of Brucellosis is Understated
- Issue 2: The Risk to Humans is Overstated
- Issue 3: Risk of Brucellosis Transmission to Park Visitors
- Issue 4: Risk of Transmission from Meat
- Issue 5: Risk of Transmission from Handling Carcasses
- Issue 6: Donation of Live Bison to Native American Tribes
- Issue 7: Strain 19 a Human Health Risk
- Issue 8: Protection of Public Health and Milk Supply
- Issue 9: Centers for Disease Control

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (HH-31) 254
- Issue 10: Bison as Traditional Diet

Livestock Operations

Public Grazing Allotments — Modify (LO-28) 257
- Issue 1: Cattle Allotment Removal or Modification
- Issue 2: Legal Questions
- Issue 3: Other Questions on Livestock Grazing

Cattle — Brucellosis Class-Free Status (LO-25) 266
- Issue 1: Other States' Actions
- Issue 2: USDA Authority and Actions Relative to Brucellosis Status
- Issue 3: Changing APHIS Regulations
- Issue 4: Apply Status to Portions of a State
- Issue 5: Limitations on Cattle Grazing

Issue 6: Methods of Risk Management
Issue 7: Is Brucellosis Really a Disease Issue?
Issue 8: Effect of Greater Yellowstone Area Wildlife as the Only Remaining *Brucella Abortus* Source after Eradication from Livestock is Completed
Issue 9: Elk
Issue 10: Regionalization of International Trade Health Regulations
Issue 11: Acquisition of Additional Lands/Easements
Issue 12: Transport of Bison Across State and International Lines
Issue 13: Transporting Meat Across Borders
Issue 14: NEPA Review of the APHIS Brucellosis-Free Status Policy

Cattle Vaccination (LO-30) 274
Issue 1: Recommended or Required Cattle Vaccinations
Issue 2: Cattle Vaccination and Brucellosis Transmission from Bison and Elk
Issue 3: Suggestions Regarding Who Should Pay for Cattle Vaccinations
Issue 4: Vaccine Efficacy
Issue 5: Historical Use of Brucellosis Vaccine in Cattle
Issue 6: RB51 vs. Strain 19
Issue 7: Vaccination Frequency
Issue 8: Brucellosis is Not Incurable

NEPA

New Alternatives/Issues (NE-4) 281
Issue 1: The Public Input Process
Issue 2: The Preferred Alternative
Issue 3: Improper Segmentation of Issues
Issue 4: Decisions Before Analysis Complete
Issue 5: Purpose of and Need for Action
Issue 6: Range of Alternatives
Issue 7: The No-Action Alternative
Issue 8: Required Sections of the EIS
Issue 9: Additional NEPA Requirements
Issue 10: Concurrent Planning Efforts
Issue 11: Cumulative or Regional Effects
Issue 12: Unknowns and Assumptions
Issue 14: Connected Actions and Cumulative Impacts
Issue 15: Corrections

Bison Effects on Free-Ranging Status and Distribution (NE-9) 295
Issue 1: Not a Full Range of Alternatives

Brucellosis Transmission and Public Perception (NE-24) 296
Issue 1: Missing Critical Scientific Detail

Objectives and Constraints

New Alternatives/Issues (OC-4) 301
Issue 1: Objectives for the Plan
Issue 2: Eradication of Brucellosis
Issue 3: Illegal or Indefensible EIS Objectives

Legal and Policy Mandates — Management Authority (OC-32) 305
Issue 1: Montana Board of Livestock Authority
Issue 2: Montana Fish, Wildlife and Parks Authority
Issue 3: State of Montana Authority
Issue 4: Montana Legislature Authority

Issue 5: National Park Service Authority
Issue 6: U.S. Department of Agriculture, APHIS Authority
Issue 7: U.S. Department of Agriculture, Forest Service, Authority
Issue 8: Coordination with Tribal Governments
Issue 9: Authority of Other States
Issue 10: Coordination with Private Organizations
Issue 11: Public Ownership of Wildlife
Issue 12: Other Public Lands
Issue 13: Land Acquisition
Issue 14: Private Land
Issue 15: Legally Implementable
Issue 16: Other Authority Issues

Socioeconomics

Benefit and Cost Impacts (SO-36) 331
Issue 1: Comparison of Costs and Benefits for Each Alternative
Issue 2: Agriculture
Issue 3: Costs to the State of Montana
Issue 4: Yellowstone Area
Issue 5: Revision of Draft Environmental Impact Statement Cost-Benefit Tables

Cost to Livestock Operators (SO-37) 337
Issue 1: Impact of a Brucellosis-Free Yellowstone National Park Bison Herd
Issue 2: Conversion from a Cow-Calf to a Steer or Spayed Heifer Operation
Issue 3: Other States
Issue 4: Impact of Eliminating Cattle Grazing on Forest Service Allotments
Issue 5: Effects of Alternative 2 on Ranchers

Minority and Low Income Populations (SO-39) 349
Issue 1: Impacts on Native Americans

Nonmarket Values (SO-40) 352
Issue 1: Economic Value of Cattle vs. Bison
Issue 2: Value of Bison to Local, Regional, and State Economies
Issue 3: Value of Bison to the Overall Visitor Experience in Yellowstone
Issue 4: Inadequate Analysis of Nonmarket and Existence Values

Reasonable Project Costs (SO-41) 358
Issue 1: Bison Management is Too Costly for the National Park Service
Issue 2: Other Alternatives Are More Cost-Effective.
Issue 3: Agencies Should Divert Funds toward Specific Management Actions
Issue 4: Specific Management Activities Were Identified as Cost-Effective or Costly
Issue 5: Questions Regarding Data Used
Issue 6: Cost Not an Issue When Preserving Bison

Social Values (SO-42) 363
Issue 1: Impacts on Those Viewing the Yellowstone Herd as a Symbol or Icon

Visitor Use

Overall Visitor Use and Experience (VU-44) 371
Issue 1: Impact of Quarantine and Capture Facilities on Visitor Experience
Issue 2: Impacts of Bison Management Activities on Visitor Use
Issue 3: Importance of Bison Viewing to the Visitor Experience
Issue 4: Importance of Bison Viewing to Tourist Economy
Issue 5: Wildlife Viewing as Essential to the Yellowstone Visitor Experience
Issue 6: Importance of Yellowstone Park Ecology to the Visitor Experience

Issue 7: Impact of Bison Population on Vegetation in Yellowstone National Park
Issue 8: Human and Wildlife Interactions
Issue 9: Importance of Snowmobiling in Viewing Wildlife
Issue 10: Impact of Snowmobiling on the Visitor Experience
Issue 11: Recreational Opportunities
Issue 12: Access to Yellowstone National Park

Winter Recreation (VU-45) 380
Issue 1: Incomplete Winter Socioeconomic Impact Analysis
Issue 2: Winter Use Economics
Issue 3: Winter Park Accessibility
Issue 4: Winter Use Economics
Issue 5: Snowmobiling Fees
Issue 6: Winter Use Policy
Issue 7: Winter Use Policy and NEPA Compliance
Issue 8: Winter Use Studies and Data
Issue 9: Incomplete Winter Use Data
Issue 10: Winter Road/Trail Grooming

Visual Resources

Landscapes and Viewsheds (VR-47) 389
Issue 1: Impact of Marking Bison on Visual Resources
Issue 2: Impact of Management Facilities on Visual Resources
Issue 3: Wildlife Impacts on the Landscape
Issue 4: Visual Resources and Scenic Value Impacts
Issue 5: Rural Agricultural Setting

Wildlife

Brucellosis in Other Wild Ungulates (WI-21) 395
Issue 1: Management of Bison vs. Elk and Other Species
Issue 2: Additional Analysis, Data, Information, or Other Changes
Issue 3: Ability to Meet Objectives
Issue 4: Control/Eradication of Brucellosis
Issue 5: Transmission of Brucellosis by Other Wildlife
Issue 6: Miscellaneous

Predators and Scavengers/Ungulates (WI-48) 402
Issue 1: Support or Opposition for Specific Alternatives
Issue 2: Impacts on Ecosystem Processes/Maintaining Ecosystem Integrity
Issue 3: Support or Opposition to Specific Alternative Management Actions
Issue 4: Additional Information or Analysis/Miscellaneous
Issue 5: Availability of Meat/Carrion for Predators and Scavengers

Threatened and Endangered Species (WI-49) 413
Issue 1: Threatened and Endangered Species Dependence on Bison Carrion
Issue 2: Bison and Elk Carrying Capacity Relative to Threatened and Endangered Species
Issue 3: Relationship of Bison Carrying Capacity to Grizzly Bears and Wolves
Issue 4: Impacts on Threatened and Endangered Species Outside the Park
Issue 5: Effects of Winter Trails and Snowmobiles on Wolverine and Lynx
Issue 6: Lynx
Issue 7: Wolverine
Issue 8: Incomplete DEIS Analysis
Issue 9: Cumulative Impacts on Threatened and Endangered Species
Issue 10: Black-Footed Ferret and Black-Tailed Prairie Dogs
Issue 11: Plants

Issue 12: Salmonids
Issue 13: Trumpeter Swans
Issue 14: Wolf/Bison Interactions
Issue 15: Incomplete Wolf Impact Analysis
Issue 16: Grizzly Bear Cumulative Impacts
Issue 17: Feed Grizzly Bears with Positively Tested Bison
Issue 18: Grizzly Bear's Dependence on Bison
Issue 19: Dispersal of Grizzly Bears
Issue 20: Grizzly Bears with Brucellosis
Issue 21: Incomplete Impact Analysis for Grizzly Bears
Issue 22: Grizzly Bear Effects on Bison
Issue 23: Human/Grizzly Bear Conflicts
Issue 24: Effects of Hazing on Grizzly Bears
Issue 25: Impacts on Grizzly Bears in a Management Situation 1 Area
Issue 26: Effects of the Land Exchange on Grizzly Bears
Issue 27: Effects of Hazing on Bald Eagles
Issue 28: Effects of Alternative 6 on the Nesting Pair of Bald Eagles at the Seven-Mile Bridge
Issue 29: Manage Bison as a Protected Species
Issue 30: Compliance with the Endangered Species Act
Issue 31: Formal Consultation with the U.S. Fish and Wildlife Service

The alternatives

Adjustments to Interim Plan (AL-2)

Issue 1: ***Include Specific Management Activities in Alternative 1 (Interim Plan)***

A Comment: Quarantine should be added to alternative 1.

Response: Alternative 1 is the "no-action" alternative, i.e., the current *Interim Bison Management Plan*, and does not include a quarantine facility. However, alternative 4 in the environmental impact statement is very similar to alternative 1 except for the addition of a quarantine facility and hunting. The description of this alternative is located on pp. 84–89 of the *Draft Environmental Impact Statement*.

Representative Comment: 15543AI

Issue 2: ***Analysis of Alternative 1 is Incomplete***

A Comment: Analysis of effects on the bison population in alternative 1 is incomplete because all bison are assumed to be captured and tested, and shooting untested bison in the west boundary area is not considered.

Response: In the unlikely event future conditions in the West Yellowstone, Montana area were similar to the 1996–97 winter, i.e., capture facilities were effective in capturing only 27% of the bison entering the west boundary area, and the agencies chose to shoot all remaining untested bison, approximately 16% of the bison entering the west boundary area might remain on public lands (see volume 1, "Appendix A: Evaluation of Adjustments to Interim Bison Management Plan, Winter 1997-1998 — Impacts of Adjustments to Bison Population"). Since the winter of 1996–97, the cooperating agencies have implemented adjustments to the interim plan with the intent to reduce the number of bison killed as part of management actions. Those adjustments have included hazing bison, constructing a second capture facility in the Horse Butte area, and a provision that untested low-risk bison (bulls, yearlings, calves, and females that have given birth) would not have to be shot in the west boundary area for Montana to maintain its class-free status. These provisions will likely increase the percentage of bison captured and decrease the percentage of untested bison that are shot such that the resulting impacts to the bison population will be similar to those presented in the analysis for alternative 1.

Representative Comment: 15420YI

Alternative Plan B (AL-54)

Issue 1: ***Plan B for Bison***

A Comment: Please analyze "Plan B." It has the following elements:

1. Bison roam free in Greater Yellowstone Area–ecosystem, with restrictions, until the herd is free of brucellosis.

2. Population numbers are managed to achieve ecological carrying capacity for areas outside the park (if management is needed at all).

3. Bison take preference over cattle on public lands designated to be used as wildlife habitat.

4. Compensation for private property damage; administered by environmental groups.

5. Remote vaccination of bison with safe/effective vaccine for 15–20 years — assume this will reduce brucellosis to levels comparable to those in EIS alternatives.

6. Until bison are free of brucellosis:

    a. Allow steer-only grazing on public land.

    b. Cancel grazing allotments if needed to protect bison (cattle graze elsewhere).

    c. Provide incentives, compensate ranchers on private land to raise nonbreeding cattle.

    d. If not cooperative, pay to fence private land of ranchers, or haze bison off private land.

    e. Annually test cattle in the vicinity, Animal and Plant Health Inspection Service (APHIS) pays.

    f. Allow federal agencies to use whatever means available to prevent unwarranted sanctions from states against Montana imports.

    g. Encourage the state of Montana to join all other states in accepting the APHIS definition of low risk.

    h. Encourage Montana to abandon zero-tolerance of risk to scientifically based acceptable levels. Zero risk inappropriate unless disease deadly.

    i. Require that cattle be vaccinated with RB51 in impact area.

Response: Features of this alternative are analyzed separately in different sections of the final environmental impact statement. For instance, the effectiveness of vaccination for 15–20 years is analyzed in "Environmental Consequences: Impacts to Bison Population," alternative 6 in volume 1. Population, numbers, and carrying capacity are discussed in this volume, "Bison: Population." Some features, such as e, f, g, and h have been incorporated into the modified preferred alternative (see volume 1, "The Alternatives," for more information).

As a whole, this alternative would not be considered a reasonable one by the agencies charged with co-managing bison. Assuming the Greater Yellowstone Area includes significant parts of Wyoming, Idaho, and Montana, allowing bison to roam throughout the Greater Yellowstone ecosystem would increase the threat of transmitting the disease to cattle over a much broader area than any of the alternatives in the environmental impact statement. Removal of cattle from all public lands in the ecosystem would require

canceling leases on many allotments, as well as those in Grand Teton National Park. The cattle from these allotments would not be relocated; all possible grazing allotments in the three states are already occupied (see this volume, "Livestock Operations — Public Grazing Allotments" for more information). The Greater Yellowstone Area also includes many private cattle operations. Providing incentives to raise nonbreeding cattle, compensating ranchers or paying to fence or haze bison off private lands over the entire Greater Yellowstone Area would cost exponentially more dollars than any of the alternatives analyzed. Monitoring bison over this much larger area would require a proportional increase in staff; despite using additional staff, the chances of brucellosis-infected bison contacting cattle would increase as bison would not be easy to find. Vaccinating cattle in the impact area would protect only 65%–70% as RB51 is not 100% effective. Additional testing costs would be significant. An effective vaccine for bison is also likely to be less than 100% effective, and bison would be dispersed over a much larger area and more difficult to vaccinate. As noted in the responses to the questions regarding bison vaccination, vaccinating for even 15–20 years does not eliminate brucellosis in bison, but only lowers the seropositive rate to 4%–11% when bison are contained and monitored in a small enough space that most of those targeted can reasonably have been expected to have been vaccinated (see volume 1, "Impacts on Bison Population: Model Results and Interpretation"). These problems and the risk of transmission to a larger sector of cattle in the U.S. are some of the reasons why the largest boundaries considered are those in alternative 2. Going beyond these boundaries, while bison remain infected with brucellosis, would violate the constraining objectives identified by the agencies as appropriate for the life of a 15-year management plan for bison, in particular numbers 5 (protect livestock from the risk of brucellosis), 1, 2, 4, and 6.

Representative Comment: 10475AE

B Comment: Analyze an alternative which has all the features of "Plan B," but does not include vaccination of bison and removes all cattle from public lands.

Response: This would be very similar to the "Bison Alternative" (see responses in the "Alternatives: Bison Alternative" section).

Representative Comment: 2260AA

C Comment: Analyze an alternative which has all the features of "Plan B," but removes seronegative bison to wildlife reservations.

Response: Please note that "Plan B" specifically does not include capture or quarantine facilities — both would be required to test bison to see whether they are seronegative and hold them for a period of time to ensure they remain seronegative (see this volume, "Bison: Quarantine Operations" for more information). Several alternatives analyzed in the final environmental impact statement including the modified preferred alternative, provide for the release of disease-free bison from quarantine to tribes and other appropriate recipients.

Representative Comment: 5886D

D Comment: Analyze an alternative similar to "Plan B" that manages risk by keeping bison and cattle separated and vaccinates cattle.

Response: All alternatives selected for analysis in the EIS process manage risk by keeping bison and cattle separated and vaccinating cattle.

Representative Comment: 7317A

E Comment: Analyze the effectiveness of giving ranchers economic incentives to keep cattle away from places frequented by bison.

Response: Alternatives 2, 3, and 7 include offering ranchers in the impact area economic incentives to switch to nonbreeding cattle, to sell their land, or to sell conservation easements on their land to agencies to provide habitat for bison. All alternatives include the spatial and temporal separation of bison and susceptible cattle, i.e., cattle and bison do not intermingle. It is only the possible shedding of bacteria into the environment (through abortion, contaminated feces, urine, or carcasses) or bison unwilling to be hazed back into the park that are of concern. In this sense, cattle are already kept away from places frequented by bison until those places are safe for cattle to return.

Representative Comment: 7500E

F Comment: Redraft the environmental impact statement to include "Plan B" or produce a supplemental environmental impact statement to include it and others.

Response: The decision on whether to respond to comments in a final environmental impact statement or to produce a revised or supplemental draft environmental impact statement is addressed in the section on the National Environmental Policy Act (NEPA). As noted above, "Plan B" does not fulfill the purpose and need of taking action (as indicated by its inability to meet several stated objectives), and is geographically outside the scope of this plan.

Representative Comment: 10428AA

G Comment: Why isn't "Plan B" the preferred alternative in the current *Draft Environmental Impact Statement*?

Response: The preferred alternative is the one the agencies believe best met the complex set of objectives they had decided would determine the reasonableness of all alternatives. It also best resolved the stated need, met the purpose of the plan, and had acceptable environmental impacts. "Plan B" would achieve half the purpose statement, i.e., to maintain a wild, free-ranging population of bison. But it would not "protect the economic interest and viability of the livestock industry in the state of Montana" from the threat of brucellosis infection by bison for the reasons stated above.

Representative Comment: 13173H

H Comment: Analyze "Plan B" with the following changes: bison are not vaccinated, but cattle are; hunting is used only as part of a careful conservation plan, with all fees benefiting the bison; no grazing on public lands surrounding the park.

Response: Hunting is not part of "Plan B," but bison vaccination is perhaps the main component of "Plan B" to reduce the risk of transmission of brucellosis to cattle. Without vaccination of bison, the other elements of "Plan B" described above (such as allowing them into the entire three-state region of the Greater Yellowstone ecosystem) would be even riskier for the area's cattle, as cattle vaccination does not impart 100% protection.

Representative Comment: 14337B

I Comment: "Plan B" is humane, involves no killing or confining of bison, is scientifically sound, and cost effective. Why do your plans not meet these same criteria?

Response: The agencies chose criteria spelled out as objectives and constraints in volume 1, "Purpose of and Need for Action." Some of these overlap with the criteria mentioned (humane, scientifically sound). However, others, such as addressing bison population size and distribution, having specific commitments regarding the herd size, clearly defining a boundary line beyond which bison will not be tolerated, are considered important mandates by the agencies charged with managing bison.

Representative Comment: 14556E

J Comment: "Plan B" does not "cut to the quick," which is the eradication of this disease in the Yellowstone National Park bison herd.

Response: Eradication of brucellosis in bison is not an objective of the bison management plan. Only the commitment to its eventual elimination, as indicated by a reduction in seroprevalence in all alternatives, is an objective (see DEIS, p. 29, objective #4).

Representative Comment: 14939A

K Comment: "Plan B" is nonmanagement and is irresponsible.

Response: Only the organizations proposing "Plan B" can respond to this statement.

Representative Comment: 15543LI

Alternatives/Issues Eliminated from Further Consideration (AL-3)

Issue 1: ***Feeding Bison***

A Comment: The agencies should drop or deliver food to bison if they are faced with starvation. The park should make an exception to its general policy.

Response: Artificial feeding was tried in the late 1970s and early 1980s in an attempt to stop or impede bison movement during severe winter weather. National Park Service personnel used vehicles and helicopters to place hay in bison-use areas on known travel routes. The project failed. Bison were not attracted to the feed placed in the high-use areas and walked by feed placed along the travel routes out of Yellowstone National Park. Other ungulates, elk in particular, are attracted to supplemental feed sources and may be unintentionally fed if attempts are made to deliver food to bison. Besides encouraging larger than natural population growth and being in conflict with the park's natural regulation policy, concentrations of elk (or bison) around feeding areas would likely result in an increase in transmission of brucellosis among and between the herds.

All alternatives include the provision of keeping a group of bison temporarily at capture facilities where they would be fed during harsh winters if the population numbers were below or approaching 1,700.

Representative Comment: 39C and Form 34E

B Comment: Feed bison until a management plan is in place to keep them inside the park.

Response: Artificial feeding was dismissed as an alternative for the reasons described above under "A," as well those outlined on p. 38 of the *Draft Environmental Impact Statement*.

Representative Comment: 15735A

C Comment: The agencies should create a lottery to buy food for bison in dire emergencies.

Response: Inadequate funds to finance feed is not the reason the agencies did not pursue this as an alternative. Please see response to "A" above.

Representative Comment: 33B

D Comment: Supplement bison food with sea salt, fish scraps, and trace minerals to keep them in the park.

Response: There is no reason to believe bison are suffering from a mineral deficiency; rather, it appears that forage becomes inaccessible during certain winters when it is covered with ice that bison cannot penetrate.

Representative Comment: 448D

E Comment: If the bison are kept in an artificial space like a zoo, they should also be fed, and ice and snow cleared away from their food, as in a zoo.

Response: We do not believe allowing bison to freely roam the 2 million acres of Yellowstone National Park is the same as to keeping them in a zoo. In addition, bison are not kept in the park in most alternatives, but are allowed to access a wide portion of the habitat that would naturally be available to them. If the population of bison is kept to 1,700–3,500, data and experience suggest they will continue to occupy the park and portions of lands outside the park identified in the environmental impact statement as winter range indefinitely.

Representative Comment: 1496E

F Comment: Bison should be fed and calves distributed to the InterTribal Bison Cooperative.

Response: The distribution of live bison to the InterTribal Bison Cooperative has been addressed in "Bison: Distribution (Live)." Also, the need for supplemental feeding of bison is addressed above, and in "Bison: Vegetation/Vegetative Communities."

Representative Comment: 5507C

Issue 2: ***Fencing Bison or Controlling Distribution***

A Comment: Why aren't ranchers responsible for protecting their cattle by fencing bison out?

Response: Cattle in the area of concern graze on large acreage of public and private lands outside of Yellowstone National Park. (See volume 1, tables 22, 23, 24, 25.) Some cattle are fenced where practicable; other areas, especially on public lands, cannot be realistically fenced without great cost and impacts to other activities and uses (i.e., wildlife movement, recreation, etc.) The movement of bison onto winter range outside of the park, under certain conditions and prescriptions, as provided by in the modified preferred alternative, would be precluded if those same lands were fenced. Spatial and temporal separation can be more realistically achieved by the management actions prescribed in the alternatives considered in the environmental impact statement, including the modified preferred alternative. The options of fencing the entire park and fencing cattle were considered, but not evaluated further, because these options did not fully meet plan objectives.

Representative Comment: 3887D

B Comment: Fence the park or special management areas (SMAs) to keep bison from leaving.

Response: This is an alternative the agencies considered but rejected because it was considered infeasible. The reasoning behind dropping this alternative is discussed on p. 38 of the *Draft Environmental Impact Statement*. In summary, the kind of fencing it would require to restrict bison movement (very strong, substantial fences or electrified fences) would also restrict movement of other species that do not harbor *Brucella* into their natural winter range. Fences would be expensive and significantly less effective in the winter, when they would be likely covered with snow. They would also create a "zoo" like atmosphere, which is contrary to wildlife management policies of the National Park Service and the U.S. Forest Service.

Representative Comment: 17713D and 10348E

C Comment: Either vaccinate bison, bring them back into Yellowstone National Park, or build fences where needed to keep them inside the park boundaries.

Response: Fencing the park is considered unreasonable for the reasons mentioned above and in the *Draft Environmental Impact Statement* (see DEIS, p. 38). However, all alternatives include the vaccination of bison and all except phase 2 of alternative 2 include "bringing them back into the park" in the spring before cattle return to graze in the summer. Alternative 2 manages the risk of transmission by reassigning cattle allotments or changing to nonbreeding cattle where bison and cattle overlap.

Representative Comment: 130C and 9209H

D Comment: Use electric fences, powered by batteries, to direct bison.

Response: Limited, site-specific fencing to direct bison is retained as a management option in the final environmental impact statement.

Representative Comment: 2082Q

E Comment: Have you considered placing cattle guards on roads or snowmobile trails to keep bison from using them?

Response: While placing cattle guards on a road corridor may prevent bison from moving along a road at a particular point, cattle guards would not likely be effective in preventing movement of a wild, free-ranging bison population, particularly on the northern range of Yellowstone National Park. As with other wildlife, bison are not limited to traveling along paved road surfaces at any season, including winter. Bison can and do move along numerous trails and travel corridors away from paved road systems. Bison can easily step off roads and move around cattle guards. Cattle guards would also not be effective in preventing bison movement out of the park as most bison cross park boundaries away from any road system. A cattle guard system was used on the northern winter range in 1986 and it failed to prevent bison movement (Meagher 1989b). In other areas, winter snows might likely fill cattle guards and render them ineffective. For these reasons, cattle guards are not generally viewed an effective option in controlling movement of a free-ranging bison population.

Representative Comment: 4420A

F Comment: The agencies should destroy wild populations and replace them with domesticated ones to prevent them from migrating.

Response: Part of the purpose of the plan is to maintain the wild and free-ranging bison population that exists in and around Yellowstone National Park today. This herd has special importance because it is the last remnant of the indigenous wild herds that once covered North America. The background and cultural resources section of the final environmental impact statement have added information on the unique nature of this wild herd.

Representative Comment: 15521E

Issue 3: ***Sterilization of Bison***

A Comment: Immunocontraception is a feasible and humane alternative to hunting. Why was it eliminated?

Response: This question is addressed in more detail in "Bison: Population," issue 5 (maintaining population within stated objectives). In brief, in addition to the factors already cited in the *Draft Environmental Impact Statement* (see pp. 39–40), contraceptive agents could disrupt family and social bonds in the herd. Technology does not currently exist to administer them to free-ranging populations of large mammals, and to date no such population has been effectively controlled using available contraceptive techniques (Garrott 1995). The final environmental impact statement text has been revised (see volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Alternatives Suggested but not Analyzed") to further explain reasons why wildlife birth control methods in this situation are not feasible and the adverse impacts to the bison herd they would cause.

Representative Comment: 9100E

B Comment: Population size is related to migrations, and sterilization would control population size. It should be considered in more depth.

Response: Please see above (3A).

Representative Comment: 15316Q

New Alternatives/Issues (AL-4)

Issue 1: ***Objectivity of Science in the Environmental Impact Statement***

A Comment: The environmental impact statement should use the impartial science of the National Academy of Sciences report.

Response: The agencies are using relevant material in the National Academy of Sciences report (NAS 1998) in responding to comments.

Representative Comment: 9686D

B Comment: The agencies should use the entire National Academy of Sciences report and not just select pieces.

Response: Not all of the material in the report is relevant to the bison management plan. The segments that are important to the bison management plan will be used in responding to comments and questions from the public and organizations.

Representative Comment: 15142AC, 15316

C Comment: The agencies should have sought court permission to delay the *Draft Environmental Impact Statement* to include the findings from the final National Academy of Sciences report.

Response: We disagree. The information in the National Academy Sciences report was not new research, but a compilation of existing research and conclusions based on it. The information cited in the National Academy of Sciences report was also available to the analysts completing the *Draft Environmental Impact Statement*, whether the National Academy of Sciences report was in draft or final form. As the *Draft Environmental Impact Statement* indicated, researchers reach different conclusions based on the same information in the bison debate. This is why a discussion of "alternative interpretation of risk" is included in the environmental impact statement and a range of alternatives, population numbers, and management tools is analyzed.

Representative Comment: 15847AG

D Comment: The *Draft Environmental Impact Statement* is not a thorough and scientifically complete document as required by National Environmental Policy Act. The information is suspect.

Response: The information used by each of the analysts was the best available in the analyst's professional judgment. In many cases, research findings on some of the key questions are different from study to study, or are open to a variety of interpretations. In others, such as the risk of transmission, answers are nearly impossible to come by because many of the key factors are unknown. Also, as indicated in the National Academy of Sciences report, the risk of transmission is too small to accurately measure.

Representative Comment: 13464F

E Comment: The data in the *Draft Environmental Impact Statement* are perverted and show disregard for scientific protocol. The environmental impact statement must include data from the National Academy of Sciences report, the Greater Yellowstone Interagency Brucellosis Committee bull bison report, the Montana cattle industry, etc.

Response: The agencies respectfully disagree with the conclusions of the commenter. In the development of the *Draft Environmental Impact Statement*, the agencies used the best available ecological and

economic data from a variety of sources, and the data were analyzed using current scientific protocol from the appropriate discipline. Data from the National Academy of Sciences report (NAS 1998), Greater Yellowstone Interagency Brucellosis Committee, and others have been used extensively in the responses to comments on the *Draft Environmental Impact Statement* as well as in formulation of the final environmental impact statement document.

Representative Comment: 14819P

Issue 2: *Scope of Analysis*

A Comment: Why is the analysis limited to Montana? Why aren't Idaho or Wyoming mentioned in the plan?

Response: Although there are documented cases of bison that migrate into Wyoming and Idaho, the numbers of animals entering these states is very low compared to migration rates into Montana. On p. 21 in the *Draft Environmental Impact Statement*, it states that "Individuals or small groups of bison (usually bulls) move to other areas of the park [Yellowstone National Park], or occasionally leave the park to the east, south, or southwest, but most movement from the park has been into Montana, along the Madison River to the west and the Yellowstone River to the north." The few bison that migrate out the east entrance into Wyoming occupy U.S. Forest Service land with no cattle grazing. Wyoming Game and Fish allow a limited number of bull bison to use this area and have a controlled hunt (Wild Bison Reduction Season) to remove bison when limits are exceeded and to remove any female bison. Since a majority of bison that migrate out of the park do so into Montana onto lands under other jurisdictions that may be occupied by cattle at certain times of the year, this environmental impact statement focuses on the area in Montana adjacent to Yellowstone National Park. Where alternatives propose management actions (such as from the transportation of cattle into adjacent states for the winter from impact areas or socioeconomic impacts from limiting winter recreation access into the park) that could cause impacts to the surrounding gateway communities of Montana, Wyoming, and Idaho, those areas are identified in the appropriate sections of the environmental impact statement.

Representative Comment: 14883C

B Comment: The environmental impact statement should address the entire Yellowstone ecosystem, not just the corner that borders Montana.

Response: While bison are still infected with brucellosis, the agencies responsible for their management concluded it would be unwise to allow them into the entire three-state region of the Greater Yellowstone Area for reasons described under the response to "Plan B." The agencies drew (from experience) a manageable impact area where bison leaving Yellowstone National Park in the winter could be monitored, and from where bison would return to the park area when cattle are grazed in the spring, summer, and early fall. The impacts to resources in this impact area are the focus of this environmental impact statement, although as described above, some impacts to areas of Wyoming or Idaho would be experienced and are discussed.

Representative Comment: 14904E

C Comment: Manage the ecosystem, not just the bison.

Response: Although the idea has merit, it would involve extensive coordination and bison would continue to be managed year to year as they are now until the coordination, analysis, and compliance were completed. Given that even the bison management piece has taken more than nine years, the agencies did not believe waiting for an ecosystem-wide plan was in the best interest of the bison.

Representative Comment: 5218D

D Comment: The disease must be controlled in the entire Greater Yellowstone Area; other states are involved besides Montana.

Response: See above. The agencies acknowledge that the disease occurs elsewhere in the Greater Yellowstone Area, i.e., a substantial portion of feedground elk in Wyoming are known to test seropositive. While efforts to address the disease throughout the region must be undertaken, the agencies have focused on Yellowstone bison during this EIS process so as to not delay action while the larger issue is examined.

Representative Comment: 9243C

Issue 3: ***Cost-Effectiveness***

A Comment: The alternatives in the *Draft Environmental Impact Statement* should be evaluated for cost effectiveness and then compared to "Plan B" and other citizens' alternatives. "Plan B," for example would only cost $3 million.

Response: Volume 1, "Alternatives: Summary Comparison of Actions in Alternatives Submitted after Release of the *Draft Environmental Impact Statement*," provides a comparison of elements of "Plan B," as well as other citizen's and organization's alternatives. The analysis concludes that all elements of these suggested plans are either covered in one or more FEIS alternatives, or did not meet the objectives to a large degree. The GAO (1999) report concluded that not enough information was submitted by the groups to fully assess the cost and benefits of those alternatives compared to FEIS alternatives. Nevertheless, the socioeconomic analysis has been revised in the final environmental impact statement to more accurately address the costs and benefits of the alternatives. (See volume 1, "Environmental Consequences: Impacts on Socioeconomics — Summary of Benefits and Costs" and this volume, "Socioeconomics: Reasonable Project Costs.")

Representative Comment: 4354B

B Comment: In addition to considering cost-effectiveness in accomplishing purpose, each alternative must also be more accurately costed.

Response: Project costs have been revised with updated information for each of the alternatives analyzed in the final environmental impact statement, including the modified preferred alternative. See volume 1, "The Alternatives," for more information.

Representative Comment: 10682H

Issue 4: ***Alternatives to Reduce Risk Management***

A Comment: Why not track seropositive bison with radio collars to see if they are contacting cattle?

Response: One of the main goals of the alternatives analyzed is to reduce the risk of brucellosis transmission by maintaining both spatial and temporal separation of bison and cattle. Each alternative employs a variety of measures to ensure that bison and cattle do not come in contact with one another. Since bison and cattle are not permitted to commingle, placing radio collars on bison to determine if they are contacting cattle is unnecessary.

Representative Comment: 5187E

B Comment: Yellowstone National Park needs a law that visitors must sign a release of liability if injured or have a loss of property due to wildlife to protect that wildlife.

Response: The United States has laws that provide when the federal government is or is not responsible for the actions of wildlife within national parks. The *Management Policies* of the National Park Service

also recognize that within parks the service occasionally must manipulate wildlife, both on individual and herd levels, to protect persons, property, and other park resources.

Representative Comment: 9042F

C Comment: Introduce a sacrificial cattle herd to mingle with bison in a natural setting and see if they become infected. If cattle contract the disease, destroy them and compensate owner.

Response: This option was considered but not analyzed because it would not present any information useful for addressing the management of bison. Research is currently underway to better determine the risk of bison transmitting the disease to cattle using scientific techniques and methods prescribed by a variety of sources, including the Greater Yellowstone Interagency Brucellosis Committee (GYIBC). Appendix D in volume 1 provides a listing of the type of research being conducted to determine, among many things, under what conditions disease transmission occurs.

Representative Comment: 10537F

D Comment: Risk could be managed without lethal controls through hazing, herding, or fencing.

Response: Several alternatives minimize the use of lethal controls. In the modified preferred alternative, hazing, quarantine, and other nonlethal tools are used preferentially; lethal control is a measure of last resort.

Representative Comment: 13472K

E Comment: A genetically resistant strain of cattle should be developed to occupy the areas of impact.

Response: There is currently insufficient information regarding genetic resistance of cattle to the *Brucella* bacteria to develop a strain of genetically resistant cattle.

Representative Comment: 5635F

F Comment: The *Draft Environmental Impact Statement* fails to adequately address brucellosis in bison and the potential for transmission to livestock in each of the alternatives.

Response: Please see "Bison: Brucellosis Risk Management" and "Brucellosis Transmission and Public Perception" for information on the potential for transmission.

Representative Comment: 14305B

Issue 5: *Research*

A Comment: The agencies should have the tribal college do brucellosis research to halt needless killing.

Response: It is unclear how having the tribal college specifically conduct research would "halt needless killing." Many research projects are currently underway to answer or refine answers to important bison management questions or to provide management tools, such as vaccines. Controlling the groups conducting this research is outside of the scope of this EIS process.

Representative Comment: 14455A

B Comment: A complete scientific analysis of the risk of brucellosis transmission from bison to cattle should be done, and a moratorium on killing bison should be in effect until it is complete.

Response: State and federal agencies are often in a position of taking management steps to improve an existing situation without knowing every detail of the outcome or without research having been completed to answer every question. In part, this is because time and money are limited; the National Environmental Policy Act recognizes this and asks that the best available information be used, rather than spending exorbitant money or time to obtain data, even if it would be useful. However, it may also be because answers will never be available, such as in the case of transmission of brucellosis between bison and cattle in the wild. Even if no case has been recorded, transmission has occurred in confined quarters and so is a biological possibility. The agencies agree the risk of transmission in the wild between these species is very low (see "Wildlife: Brucellosis in Other Wild Ungulates," or "Bison: Brucellosis Transmission and Public Perception" for more information), but it remains nearly impossible to prove it would never happen.

Representative Comment: 15579A

C Comment: Lobby Congress to significantly increase research funding for brucellosis.

Response: Thank you for your comment.

Representative Comment: 6327A

D Comment: The plan should use a 10-year time frame, since so much research is ongoing. This would allow agencies to incorporate results into a new planning effort.

Response: Agencies will incorporate research results to the extent the selected alternative allows them to in the current planning effort. Each alternative has built into it some flexibility to use or not to use different management tools, depending on the outcome of research and/or regulatory changes that would be required. As an example, vaccines for bison would not be used until ongoing research shows one that is safe and effective, both for bison and all nontarget species in the Greater Yellowstone Area ecosystem. If other research indicated large-scale changes should be implemented, the agencies would begin a new planning effort, regardless of how many years on this effort have already passed. The modified preferred alternative, for example, establishes phases based on the current and potential state of knowledge through the life of the plan. Adaptive management is used to obtain and apply research results in a series of steps or actions to achieve the plan's objectives.

Representative Comment: 15420JJ

E Comment: Why haven't transmission by free-ranging bison to cattle, the impact of closing snowmobile roads and the idea that bison transmit the disease through milk been better researched? We should have the answers to these critical questions by now.

Response: Each of the topics mentioned has been addressed in past research, or is currently being investigated. Although there has not been a documented case of brucellosis transmission from free-ranging bison to domestic livestock, the possibility of such an event occurring remains. For this reason, the agencies have chosen to use temporal and spatial separation of bison and domestic livestock as a primary mechanism for reducing the risk of brucellosis transmission. A number of research projects concerning the use of winter groomed roads by bison are underway. Researchers are attempting to determine the extent of road use by bison in the Hayden Valley, Gibbon Canyon to Mammoth, and Old Faithful to West Yellowstone areas. Preliminary research results indicate that although bison do use the groomed roadways as part of their travel network to access foraging areas, the majority of bison movements do not take place on the groomed road surface. The results of these research projects may help managers to predict the impacts to bison of closing the groomed roads. These research projects are anticipated to be completed by 2001.

Over the past four years researchers have obtained results from 89 milk/mammary secretion sample cultures. Of these, 31 were from seropositive females. Of those samples from seropositive lactating

females, only one was culture positive, and none was positive in the seronegative group. Since researchers have not yet determined what level of bacteria constitutes an infective dose, nor do they know how long bison may shed bacteria-laden milk, any culture positives are considered to be capable of transmission (T. Roffe, pers. comm.. 1999).

Representative Comment: 4924C

Issue 6: ***Legality of Plan***

A Comment: All alternatives except 5 impose unrealistic and unjustified burdens on Montana, private landowners, and the livestock industry of the state. The burden on the park is small except for alternatives 5 and 6.

Response: See volume 1, "Purpose of and Need for Action: Objectives and Constraints — Legal and Policy Mandates" and the state of Montana authority discussion in particular.

Representative Comment: 9364GG

B Comment: The only alternative that does not require a change in law and is therefore legally implementable is alternative 5.

Response: The National Environmental Policy Act requires agencies to analyze all reasonable alternatives, even those requiring a change in law or beyond what Congress has imposed, if such a change is foreseeable. This is because the information in an environmental impact statement, which shows environmental costs and benefits of each alternative, "may serve as the basis for modifying" laws, funding, or Congressional approval (40 CFR 1500.1(a) and Question 2b). The final environmental impact statement is quite clear regarding changes that would be required to implement each alternative. Each alternative also has a first phase, which can be implemented immediately upon signing the record of decision, and a second phase, which often does require some change in policy of an agency or state law (such as allowing the hunting of bison). The agencies charged with managing bison agreed each alternative was reasonable, and that the possibility of making appropriate changes was very high. The final environmental impact statement indicates elements of phase 2 would be implemented as these changes are made. The impacts of both phases are described in the final environmental impact statement.

Representative Comment: 11121D

C Comment: The alternatives are invalid because they assume the state will comply. The legislature needs to appropriate management money and approve hunting.

Response: Please see the response above. Alternatives that include elements requiring a change in policy, law, or funding are not considered invalid. In fact, the National Environmental Policy Act requires these alternatives be analyzed if they are reasonable.

Representative Comment: 9364S

D Comment: The superintendent cannot determine that bison are detrimental to the use of Yellowstone National Park or dangerous under the Lacey Act. How does he justify their removal?

Response: The National Park Service recognizes that the bison herd will have more protection inside and outside the park if the Park Service takes certain management actions inside the park. Both the federal district court in Montana and the U.S. Court of Appeals for the Ninth Circuit determined that actions under the interim management plan are allowable under current law. The National Park Service believes its actions under the various alternatives set out in the final environmental impact statement are also legal.

Representative Comment: 14714JJ

E Comment: Vaccination of bison conflict with park policies dictating natural regulation. Also, alternatives assume vaccination will occur without environmental review of the impacts. This prejudices the selection of alternatives and is illegal.

Response: Current NPS *Management Policies* (1988) provide that the Park Service will rely on natural processes to control native species "to the greatest extent possible." This does not mean that the policies prohibit the Park Service from acting to control exotic diseases, such as brucellosis caused by *Brucella abortus*, in wildlife. Only a safe vaccine, both for bison and for nontarget species, would be used on bison. The definition of "safe" is included in the final environmental impact statement (see volume 1, "The Alternatives: Actions Common to All Alternatives — Vaccination"), and the agencies believe the application of the criteria included in the definition would prevent environmental impacts. In effect, the impacts have been "analyzed," and the impacts are negligible; otherwise the vaccine would not be used.

Representative Comment: 14714U

Issue 7*: Wildness of the Herd*

A Comment: The herd should be managed like the Grand Teton National Park herd; Montana is making irresponsible demands on the agencies managing the Yellowstone National Park herd.

Response: Alternative 3 in the *Draft Environmental Impact Statement* contains several elements that are similar to the current management used for the Grand Teton National Park herd. This alternative relies on the hunting of bison to regulate population numbers, on the distribution of bison outside the park, and on temporal and spatial separation to preclude contact with cattle. As in many of the alternatives, bison are allowed on certain portions of public land outside the park and are precluded from using others. Bison found on private lands may be removed at the request of the landowner.

Bison management for the Grand Teton National Park herd proceeds along similar guidelines. In 1989 Wyoming Statutes 23-1-101 and 23-1-302 established the framework to designate wild bison as wildlife in Wyoming and as a species subject to regulations promulgated by the Wyoming commissioners. Regulations issued by the Wyoming Game and Fish Commission and the Wyoming Livestock Board designate bison as wildlife on certain federal lands within the Shoshone and Teton National Forests in Park and Teton Counties. These regulations give the Wyoming Livestock Board the authority to determine bison on other public or private lands a threat to livestock health or improvements and to require their removal by the commission or its designee. These regulations also authorize a wild bison reduction season.

Representative Comment: 14750C

B Comment: The herd should not just be free-roaming, but wild. The agencies should address reestablishing wildness.

Response: Maintaining the wild nature of the Yellowstone bison herd is one of the primary objectives of the long-term bison management plan. Each of the alternatives analyzed in the EIS process addresses the need to maintain a wild and free-ranging population of bison while also addressing the risk of brucellosis transmission. The interagency team has defined a "wild and free-ranging population" of bison as one that is not routinely handled by humans and can move without restrictions within specific geographic areas. The operation of a capture facility would not affect the wild, free-ranging character of the herd, since bison would be handled for only a short period of time. Conversely, the placement of bison in a quarantine facility would affect the wild, free-ranging nature of those individuals, since each would be required to complete a lengthy protocol before their release. Because they would lose an element of wildness, these animals would not be returned to Yellowstone National Park, but would be made available to requesting organizations to establish or augment populations elsewhere.

Representative Comment: 9023A

C Comment: Bison should be administered as wildlife, and should be introduced to all states that had pre-Columbian herds.

Response: The herd is administered as wildlife, particularly inside the park. However, it is important to note that the fact the herd is brucellosis affected also means it has special status, especially outside the park where cattle graze in the summer (see volume 1, "Purpose of and Need for Action: Background — Brucellosis in Other Wild Ungulates" for more information on other wildlife). The distribution of live bison completing quarantine will be to tribes, areas of public land, national park units, wildlife refuges, or other appropriate recipients. Beyond this, the details of who would receive live bison are unknown at this time.

Representative Comment: 15551A

Issue 8: ***Management Entities***

A Comment: The agencies should deed land to Montana, give Montana money, and let the state deal with management of bison.

Response: Yellowstone National Park is responsible for managing wildlife inside its boundaries and would be unable to relinquish this responsibility without a congressional mandate. Further, this is an unreasonable alternative because it would not meet the purpose of the plan, which is to maintain a wild, free-ranging population of bison.

Representative Comment: 14932E

B Comment: The agencies should share ownership of the bison 50/50 with the InterTribal Bison Cooperative.

Response: We believe this is outside the scope of this environmental impact statement.

Representative Comment: 15320B

Issue 9: ***New Alternatives Similar to Others***

A Comment: Analyze an alternative that has no quarantine, and treats bison like other wildlife (elk). Transfer live bison to reservations.

Response: The analysis of alternative 2 in the *Draft Environmental Impact Statement* presents an alternative that does not use quarantine as a management tool. The purpose of alternative 2 is "to restore as near-natural conditions as possible for bison, including a small portion of their historic nomadic migration patterns" (DEIS, p. 67). The agencies agreed, however, that each alternative must clearly define a boundary beyond which bison will not be tolerated (DEIS, p. 29), recognizing that land use in much of historic bison habitat is no longer compatible with the presence of large numbers of bison.

Accordingly, some bison may be hazed or shot when attempting to cross the established boundary. In developing the purpose and need for action in the *Draft Environmental Impact Statement*, the agencies recognized that "Bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in the final bison management plan, to use some lands outside the Yellowstone National Park boundary.

The provisions for acquiring access to additional lands outside the park boundary in alternatives 2, 3, and 7, and the actual acquisition of some of those lands since the release of the *Draft Environmental Impact Statement,* were included in recognition of the fact that in severe winters Yellowstone National Park may

not provide adequate winter range for bison due to elevation and consequent snow accumulation. These provisions also recognize that bison tend to use the identified areas during some winters, although detailed information on bison use is not available since bison have generally not been allowed to fully use those lands. Unfortunately, little is known about the ecology of the original North American bison herds, including bison of the Greater Yellowstone Area. It is anticipated that in the future, bison may be managed in a similar fashion as other migratory wildlife species such as elk, whether or not a hunting season is reestablished for bison in Montana. No population sizes are set for elk, for example, within the park boundary, but the Montana Department of Fish, Wildlife and Parks sets habitat and, in some cases, population objectives for elk outside the park boundary. Elk are managed to meet these objectives through a regulated annual hunting season. The National Park Service cooperates with the Montana Department of Fish Wildlife and Parks in gathering population data, including counts and herd composition estimates, that are used in setting hunting quotas and regulations. See "Bison: Distribution (Live)" in this volume for more information.

Representative Comment: 10426B

B Comment: Analyze an alternative that is a combination of alternatives 2 and 7: use alternative 2 SMA boundaries, eliminate hunting and grooming of certain roads, snowmobiling along key migrations routes, and use the rest of the features of alternative 7.

Response: The commenter can read about the impacts of such a combination by consulting the following sections: The effect of snowmobiling and grooming on the bison population is addressed in volume 1, "Environmental Consequences: Impacts on Bison Population," alternatives 2, 3, 5, and 6 (in particular, see volume 1, "Purpose of and Need for Action: Background — Bison Distribution" and "Environmental Consequences: Impacts on Other Wildlife Species"; in this volume see "Bison: Effects on Free-Ranging Status and Distribution — Issue 5). Many alternatives show the impact of hunting; comparing alternatives 1 and 4 show this best, as they are identical except for hunting and quarantine effects. The effect of enlarging the SMAs are discussed in volume 1, "Environmental Consequences: Impacts on Bison Population" for alternative 2 .

Representative Comment: 173E

C Comment: Analyze an alternative that includes the following:

1. Close groomed snowmobile trails as in alternative 2.
2. Educate ranchers on risk of disease transmission.
3. Provide incentives for ranchers to vaccinate, test, graze only nonbreeding cattle in risky areas, and avoid contact with bison.
4. Use lethal control as a last resort; all lethal control is humane.
5. Culture and blood test all carcasses.
6. Release carcasses to tribes and the public.
7. Capture and quarantine rather than shoot.
8. Quarantine bison on Yellowstone National Park or InterTribal Bison Cooperative lands.
9. Acquire as much land as feasible for bison migration — alternative 2 boundaries.
10. Ensure populations don't fall below lower limits in alternative 7, but genetic testing to make sure this is a high enough number.

11. Allow hunting if fair chase, other EIS provisions apply.

12. Modify grazing on public lands to indicate ranchers accept risk.

13. Allow no test or slaughter inside Yellowstone National Park.

14. Invest in a more effective test than present serology test.

15. Do not immediately slaughter pregnant seronegative bison, but provide long-term separation, continued testing, and quarantine.

16. Provide a different quarantine protocol–less severe.

17. Release five seronegative bison to public and tribes.

Response: All of these elements are addressed in one or more of the alternatives analyzed in the final environmental impact statement, or have elements that cannot be reasonably implemented, or as a package do not further meet the plan objectives in any measurable way beyond the alternatives already considered. The modified preferred alternative was developed by the federal agencies to address public concerns regarding the humane treatment of bison, using slaughter and shooting as a last resort, while protecting Montana livestock from the risk of disease transmission from Yellowstone bison. Research items suggested above are currently underway or will be pursued as shown in volume 1, appendix D. Issues regarding quarantine are addressed in this volume in "Bison: Quarantine Operations." Snowmobile and snowgrooming effects on bison migration are addressed in volume 1, "Environmental Consequences: Impacts to Other Wildlife" and in this volume, "Bison: Effects on Free-Ranging Status and Distribution," issue 5 (Bison movement related to road grooming). Also, many of these elements are further explained in relevant sections of the responses to comments, such as quarantine, capture, test, and slaughter operations, population size, and genetic testing.

Representative Comment: 194E

D Comment: Adopt an alternative that is the same as alternative 2 with the addition of offering incentives to ranchers to leave for more sustainable careers.

Response: Although the logistics may be different, the environmental impacts of adopting this strategy would be the same as those analyzed in the EIS process, so no additional analysis is presented.

Representative Comment: 383D

E Comment: Analyze an alternative that provides for feeding bison in the winter, hunting, and/or vaccinating and distributing to tribal lands to control population; that includes an annual bison round-up, adopt-a-bison program; and that allows the herd on public land in the winter.

Response: The distinguishing features of this approach, which are not analyzed in the environmental impact statement, are limited to the distribution of live bison — that is, the idea of allowing members of the public to adopt a bison. See "Bison: Quarantine Operations" in this volume for information on the reasons why bison not completing quarantine would not be distributed.

Representative Comment: 1320A

F Comment: Analyze an alternative with the following features: increased park size, closed snowmobile routes, shoot cattle coming too close to bison or fine ranchers, lease or lend bison to tribes to establish herds, lobby Congress for additional research money for brucellosis.

Response: Increasing the size of the park is considered an unreasonable option. Some alternatives do envision closing some snowmobile trails, or plowing roads to transport bison (which would eliminate the use of these roads for snowmobiling). Bison and cattle will not be in direct contact in any alternative, particularly since the acquisition of lands on which the only wintering cattle operation in the impact area is ongoing. Therefore, no shooting of cattle would be needed. Bison completing quarantine would be available to tribes or other appropriate recipients to establish herds. The agencies continue to request research funding for efforts they believe are important in understanding the epidemiology and pathology of brucellosis in bison.

Representative Comment: 6327A

G Comment: Analyze an alternative with the following features:

1. Bison priority on national forest lands adjacent or near Yellowstone National Park.
2. If a conflict occurs, cattle grazing is delayed or discontinued.
3. Purchase easements, acquire land for winter range, migration routes.
4. No corrals or structures in Yellowstone National Park to slaughter or quarantine bison.
5. Haze off private property if needed.
6. Some sport hunting to control population.
7. Tribes given first priority to hunt.
8. Encourage landowners to allow bison on private lands, compensate for property damage.
9. Reduce winter road grooming — positive impact on wildlife feeding on bison.
10. No quarantine or slaughter of bison unless similar program for elk.

Response: Giving members of tribes a priority hunting right would likely involve an analysis of treaties between the United States and the individual tribes. Treaty rights present very complex issues, and the resolution of those issues is beyond the scope of this EIS process. Regardless of treaty issues, however, the federal agencies will continue to consult with tribes on bison management issues.

Representative Comment: 6704A

H Comment: Analyze an alternative with the following features:

1. Health certification center to allow healthy bison to roam to and from winter grazing pastures
2. Bison are more important than cattle on lands adjacent to Yellowstone National Park, so restrict cattle so no overlap occurs, or eliminate allotments.
3. Increase landowner tolerance until bison can be peacefully removed and relocated.

Response: The idea of preventing overlap on public lands is part of every alternative, and the elimination of change of allotments is part of phase 2 of alternative 2. Several commenters suggested increasing landowner tolerance of bison; the agencies agree education would be an important tool in any alternative. Although it is unclear, we assume a health certification center to allow healthy bison access to winter grazing lands would be similar to a capture and test facility. The impacts of such a facility, and of letting

low risk bison onto land within the SMAs are described in several alternatives, including phase 2 of alternatives 3 and 7.

Representative Comment: 6758B

I Comment: Analyze an alternative that has the same population objectives as alternative 7, but adds hunting as an additional means of population control and modifies grazing allotments as in alternatives 2 and 3.

Response: The addition of hunting as a technique to help control population numbers would not add any impacts to the ones already examined in the environmental impact statement. Population numbers would not change, and the impacts of hunting itself are described in the following sections, "Impacts on Other Wildlife Species," "Impacts on Human Health," and "Impacts on Threatened, Endangered, and Sensitive Species" in volume 1 under "Environmental Consequences: Wildlife."

Alternative 7 envisions only low-risk bison grazing outside the park, and a 30–60 day window between the time bison return to the park and cattle are grazed on these same lands. Changing allotments would not reduce risk any further than it already is through the use of these techniques. The impacts of closing allotments generally are discussed in volume 1, "Environmental Consequences: Impacts on Livestock Operations — Impacts of Alternative 2"; however, for the reasons described above, the agencies do not consider this to be a reasonable alternative.

Representative Comment: 9023G

J Comment: Analyze a modified alternative 6 with the following features:

1. Provide immediate RB51 vaccination of calves and yearling bison.
2. Use empirical data from ranched bison to see if RB51 is effective/safe for adults using reduced dose until efficacy studies are complete, beginning with seronegative adult females.
3. Reduce phase 1 (stabilization of seroprevalence through vaccination) to 5 years.
4. Eliminate western SMA bison capture at Seven-Mile Bridge, return seronegative bison to Yellowstone National Park or quarantine. Strays are shot by the National Park Service before reaching western boundary.
5. Designate a northern SMA at Eagle Creek/Bear Creek only.
6. Make hunting in Eagle Rock/Bear Creek acceptable.
7. Use quarantined bison from Stephens Creek and Seven-Mile Bridge to test vaccines, locate adjacent to Stephens Creek or near Seven-Mile Bridge facility, Lamar Valley, or Madison River.
8. Provide seropositive carcasses to bears to mitigate loss of bison.
9. Mitigate swan impact (no specifics).
10. Keep herd to 1,800 until a non-National Park Service scientific team finds Yellowstone National Park has a capacity to sustain a larger population.

Response: This alternative was suggested by the U.S. Animal Health Association and others. A comparison of the elements of this alternative with others analyzed in the final environmental impact

statement can be found in volume 1, "The Alternatives: Summary Comparison of Alternatives Suggested by Organizations during the Representative Comment Period." In years 6–15, this alternative would have major impacts on the bison population similar to years 1–10 for alternative 5. Capture facilities would have impacts similar to those described for alternative 6. The location of a quarantine facility would require an additional NEPA process, especially if it was located adjacent to either of the capture facilities proposed by the U.S. Animal Health Association. Using different standards for deciding when a vaccine is appropriate for bison would be at odds with the decision the agencies have made to use GYIBC criteria to determine safety and effectiveness for each class of bison and safety for nontarget species. Since this is a unique herd of bison and they occupy a national park, the use of any but the most stringent of criteria to determine safety and effectiveness is not considered reasonable or feasible. The immediate use of RB51, for example, would not be possible as tests on its safety in adult female bison who had been vaccinated as calves, and tests on nontarget wildlife, have not been completed. In addition, the use of a 5-year vaccination period, rather than a 10-year period as described in alternative 6, would not allow seroprevalence to stabilize (as indicated by analysis completed using the stochastic model — see volume 1, "Environmental Consequences: Impacts on Bison Population"). The model indicates stabilization would take 17 years of vaccination. The agencies reject this alternative as unreasonable because of these reasons.

Representative Comment: 9364QQ

K Comment: Analyze an alternative that has no management at all.

Response: A no-management alternative was described in the *Draft Environmental Impact Statement* (see p. 112), but was rejected by the agencies for several reasons, primarily because the chance of contact between infectious bison and cattle would dramatically increase if bison were not monitored or managed in any way. Also, since bison would eventually occupy a much larger area where brucellosis has not been a concern for many years, vaccination and testing would likely not be as rigorous and an infection could go undetected. Since Montana exports cattle, this infection could travel to other states as well. The agencies did not feel that a no-management alternative would protect the economic interest and viability of the livestock industry in Montana, a stated purpose of the bison management plan. It would also fail to accomplish many of the objectives agreed to by the agencies as appropriate factors to determine whether alternatives were reasonable (all except alternative 7 and the modified preferred alternative — see volume 1, "Purpose of and Need for Action: Objectives and Constraints"). For these reasons, it was eliminated from full consideration as unreasonable.

Representative Comment: 10803A

L Comment: Because the *Draft Environmental Impact Statement* has a dual purpose and has analyzed two alternatives that eliminate brucellosis, it should have at least one that focuses on preservation of the bison population and its habitat.

Response: The *Draft Environmental Impact Statement* analyzes such an alternative as the second phase of alternative 2. In fact, the agencies decided the appropriate range of alternatives based on the two pieces of the purpose statement. Alternative 2 emphasizes the wild and free-ranging portion of the statement, and alternative 5, the protection of Montana's livestock-based economy. Both are considered to be at the respective limit of this range. Going any further would violate the purpose statement or one or more of the objectives, conditions that the agencies agreed would define the reasonableness of an alternative.

Representative Comment: 9568H

M Comment: Analyze an alternative that does not have a phase 1, that sets population size as ecological carrying capacity, that increases SMA size over those in alternative 7 (to Yankee Jim Canyon), and that commits strongly to a minimum of at least 1,700 bison.

Response: Because each alternative includes several unknowns, a phase of step 1 similar to the *Interim Bison Management Plan* is necessary. Although several alternatives, including the modified preferred alternative, would result in the release of seronegative or untested bison at Yellowstone National Park's Reese Creek boundary, these releases rely on the expiration of an existing cattle lease on property immediately adjacent to the park in 2002. Also, the point of each step in the modified preferred alternative is to gain knowledge and understanding that can be put to good use in the next step. The discussion of ecological carrying capacity is addressed in this volume under "Bison: Population" and "Bison: Vegetation/Vegetative Communities." The modified preferred alternative commits strongly to maintaining the bison population at 3,000 animals.

Representative Comment: 11409AEE

N Comment: Analyze an alternative that has features of alternatives 3, 4, and 5, including the use of hunting to control population size, and capture, test, removal, and quarantine operations (including seropositives) to control brucellosis, with live removal to local tribes.

Response: Most of the features you describe are already fully analyzed in alternatives 3 and 4. The reasons seronegative, rather than seropositive, bison are sent to quarantine are discussed in this volume under "Bison: Quarantine Operations." The agencies may pick elements of one or more of the alternatives to create a final "selected" alternative, if the impacts of this alternative are not different from those analyzed in the final environmental impact statement.

Representative Comment: 13225A

O Comment: Analyze a no-grazing alternative.

Response: The second phase of alternatives 2 and 3 contemplate changes in public allotments and private grazing operations before they would be put into effect. These changes would have the same effect as eliminating cattle altogether — that is, bison would be allowed to range over the entire impact area without competition from cattle. In alternative 2, bison would not be hazed back into the park in the spring, but would be allowed to remain in the SMAs year-round.

Representative Comment: 13464I

P Comment: Analyze an alternative with the following features:

1. no snowmobiling
2. government assistance to relocate businesses affected by closure of winter trails
3. close allotments on adjacent land to let bison roam
4. private companies benefiting from Yellowstone National Park (pharmaceuticals) helping pay for finding a cure to brucellosis
5. no hunting

Response: Features of the alternative have been addressed in volume 1, "The Alternatives," and in this volume, "Livestock Operations: Public Grazing Allotments — Modify," issue 1; (cattle allotment removal or modification). See other issues in this section regarding impacts of snowmobiling, road grooming, and bison movement. At the present time, there is no mechanism to require pharmaceutical companies to share in the cost of brucellosis research.

Representative Comment: 14548D

Q Comment: An alternative is needed that assumes the risk of transmission is nonexistent or minimal — then livestock owners would take steps to manage risk by immunizing cattle, maintaining fencing, vaccinating, etc.

Response: The agencies agree that the risk of transmission is very low. However, because bison have transmitted the bacteria to cattle under confined conditions, we have to assume it is biologically possible to do so in the wild. The alternatives are a range of options that agencies and ranchers can use to manage this small risk. Ranchers in the impact area already vaccinate and test their cattle. This reduces an already small risk further, but because the vaccine is not 100% effective, it does not eliminate it. This is why other alternatives employ methods to manage the distribution or infectious potential of bison as well.

Representative Comment: 14775I

R Comment: Analyze the following alternative.

1. Turn management of bison over to the U.S. Fish and Wildlife Service outside parks and to National Park Service inside parks. Both would conduct meaningful consultation with tribal governments before making management decisions.

2. Bison would be allowed outside the park within broadly defined SMAs, which appear to include the Greater Yellowstone ecosystem.

3. A buffer zone would be created around the Greater Yellowstone Area-ecosystem to protect the rest of the state from the loss of class-free status.

4. Although cattle would continue to graze public lands, that would be changed if there was any conflict with bison.

5. Winter range or key migration routes for bison on public or private land would be acquired through purchase or by offering incentives to change livestock operations.

6. Population goals based on habitat available in the park, in SMAs, or on acquired land would be established.

7. Capture facilities would be used to test bison — seropositives would be offered first for research, and then to tribes to take down in whatever fashion they think best. No agency killing, no shipment to slaughter.

8. Tribes would hunt if bison are to be hunted.

9. All seronegatives would be shipped to a quarantine facility, with distribution coordinated through the InterTribal Bison Cooperative.

10. All cattle and horses within the SMA would be vaccinated at the government's expense.

Response: Regarding item 1, the U.S. Fish and Wildlife Service manages wildlife on refuges within the national wildlife refuge system. Outside of refuges and areas within the national park system, authority for wildlife management generally lies with the states. For item 8, this comment involves the interpretation of treaties between a tribe or tribes and the federal government. Treaty rights present very complex issues and the resolution of those issues is beyond the scope of this EIS process. Regardless of treaty issues, however, the federal agencies will continue to consult with tribes on bison management issues. Please see revisions to volume 1, "The Alternatives," table 13, which compares features of each of the major alternatives submitted by organizations or governments, including the Fort Belknap Tribe. As indicated in the table, the agencies believe the geographical scope of this alternative is outside that analyzed for any other alternatives. There are no stated boundaries, commitment to population size, and the purpose of

capture facilities and quarantine in this alternative are not clear. It is also possible that the timing of cattle changes or land acquisition are such that objectives 5 and 6 could not be met. For these reasons, this alternative has been rejected by the agencies as unreasonable and out of scope.

Representative Comment: 14844B

S Comment: Analyze nonlethal solutions.

Response: Alternative 2 focuses on the management of cattle and cattle operations to reduce risk. In the impact area cattle would be removed from public or private lands, or operations would be changed to run nonbreeding cattle or to ensure no overlap with bison (through temporal separation). Within the boundaries of the SMAs, which are also the largest in alternative 2 of any of the alternatives, this is an entirely nonlethal management plan. However, bison would be monitored and hazed back into SMAs or shot if they refused to return. This is because many large cattle ranches lie outside the boundaries of the SMA, where no precautions to prevent transmission of brucellosis would have taken place. Without the ability to return bison into the SMAs, the spread of the herd, and of seropositive bison and the risk of transmission to Montana cattle, would continue as described in volume 1, "The Alternatives: Alternatives Considered But Rejected," and summarized above.

Representative Comment: 14980CC

T Comment: Analyze an alternative with the following features:

1. No slaughter.
2. Acquire grazing lands.
3. Acquire wildlife corridors.
4. Capture and transport to tribal lands for population control.

Response: The environmental impact statement has analyzed the impacts of each of these provisions, as this alternative is a combination of alternatives 2, 3, and 7. These three alternatives include provisions to acquire wildlife corridors and grazing lands. Alternative 2 has no capture, test, or slaughter operations; alternative 3 includes a small facility to capture bison remaining after a hunt and attempting to leave the impact area to the north, and alternative 7 includes capture facilities on the north and west side. These facilities are a requirement to test bison and send seronegatives to quarantine. Quarantine is a prerequisite to transporting bison to tribal lands. Although quarantine would provide a mechanism to eventually release seronegative bison to public and tribal lands, it is not anticipated that it would be a significant means of controlling the population size. In the absence of a hunt, it could fill quickly with seronegative bison, which would require a minimum of one year to complete the protocol advised by APHIS.

Representative Comment: 15106C

U Comment: Modify alternative 6 to:

1. Only allow bison in Eagle Creek/Bear Creek SMA and Yellowstone National Park.
2. Vaccinate bison for a 2-year period (phase 1).
3. Begin phase 2 in the third year.
4. Send seronegatives to quarantine; sell when clean.

5. Shut down capture and quarantine facilities when brucellosis is gone.

Response: The key difference between this alternative and alternative 6 appears to be a two-year vaccination period instead of a 10-year period as identified as phase 1 of alternative 6. The impact of this change would be the killing of significantly more bison than in alternative 6, but not more bison than in alternative 5. Therefore the impacts to bison would be between the two alternatives. It should be noted that the modified preferred alternative does establish a specific time frame for initiation of bison vaccination when found safe and effective for each class of bison (e.g., age, sex, and pregnancy status).

Representative Comment: 10638W

Issue 10: ***Completely New Alternatives***

A Comment: The Yellowstone National Park should declare bison are National Park Service property. Then, they could not be destroyed because it would be destruction of government property.

Response: In 1979 the United States Supreme Court clearly dispelled the notion that wildlife are owned by either a state or federal government in *Hughes vs. Oklahoma*, 441 U.S. 322 (1979). Within the Greater Yellowstone ecosystem, the National Park Service has the authority to manage bison within the boundaries of the national parks. Outside the boundaries the authority primarily rests with the states, except for the national wildlife refuges within the area.

Representative Comment: 15117E

B Comment: Give the money to a nonprofit group so they can use the funds where it will do good.

Response: Thank you for your comment.

Representative Comment: 164B

Issue 11: ***Use of a Buffer Area***

A Comment: Create a buffer area around Yellowstone National Park to protect bison.

Response: Please see "Bison: Special Management Areas" for a discussion of "buffer areas" and the use of spatial and temporal separation of bison and cattle within these areas to achieve plan objectives. Many alternatives do include SMAs, in essence a type of buffer between the park and private cattle operations.

Representative Comment: 8D

B Comment: Create a 10-mile buffer zone around the park for use by bison and elk.

Response: Please see above response.

Representative Comment: 8818A

Issue 12: ***A Bison Refuge***

A Comment: Environmental organizations should spend their money to set up a refuge to take bison. The park has been drained of resources and is out of harmony between animal and range.

Response: It is assumed that the intent of the commenter is to express the belief that Yellowstone National Park is overgrazed and that a refuge should be established to accept "a portion of" bison from Yellowstone National Park. Natural regulation of native ungulates was initiated in 1968 in Yellowstone

National Park, based on the premise that ungulates would reach an equilibrium with their plant resources. Prior to the initiation of the natural regulation policy, native ungulates were artificially controlled by park staff. The resultant expansion of ungulate populations has caused many to believe that Yellowstone National Park is overgrazed. The term overgrazing can be defined simply as an excess of herbivory that leads to the degradation of plant and soil resources. Overgrazing should result in reduced plant cover, increased bare ground, reduced organic inputs to the soil, drier warmer soil, and increased sediment yield following snowmelt and rain runoff (Pengally 1963). Singer et al. (1998) recently published an assessment of natural regulation in Yellowstone National Park and found the following: there was no widespread evidence of overgrazing observed through 1993 at study sites with vegetation communities that comprised about 97% of the winter range. No evidence of increased exotics, increased sediment yield, warming or drying of the soil, changes in soil nutrients, or differences in aboveground standing-crop biomass of plants was found between grazed and ungrazed plots. Ungulate herbivory apparently stimulated aboveground production of grasses, enhanced nitrogen and macronutrients in grasses, increased nutrient cycling, and enhanced measures of fitness in six common plants. However, exposed soil surface was greater on grazed than ungrazed plots, apparently due to a 71% decline in dead and standing litter on grazed plots. Percent live-plant basal cover, however, did not differ on grazed and ungrazed plots, and there was no difference in soil microclimate or sediment yield. Willow and aspen declines predated the natural regulation policy, but their slow declines continued after 1968. Some evidence of overutilization was found in aspen and Wyoming big sagebrush stands. Overall, Singer et al. (1998) concluded that there was little evidence to support the contention of overgrazing in upland shrub and grassland communities of Yellowstone National Park and that the observed declines in aspen and willow could be associated with climatic changes, fewer fires, lowered water tables due to declines in beaver populations; they could not be attributed solely to ungulate browsing.

Another of the symptoms of overgrazing is smaller, thinner, and less healthy ungulates (Coughenour and Singer 1991). This however has not been the case in Yellowstone. The 1998 report, *Brucellosis in the Greater Yellowstone Area* (NAS 1998) states that bison killed outside the park in the winters of 1991–92 and 1996–97 were in excellent body condition, with more than adequate body-fat stores. The report concluded "Thus, there is little evidence of inadequate forage or quality available to Yellowstone National Park bison." Bison that are captured in accordance with the methods described in the alternatives presented in the environmental impact statement are captured in an effort to maintain spatial and temporal separation of bison and cattle and to facilitate possible vaccination and shipment to approved quarantine facilities. Because of the presence of the *Brucella* bacteria in this population, bison that are captured and are to be removed must be either sent to quarantine, slaughter, or to approved research projects. The agencies support the distribution of live bison that have completed an approved quarantine protocol to Native American tribes, areas of public land, national park units, wildlife refuges, and approved research programs.

Representative Comment: 3032F

B Comment: Restore the park as a bison sanctuary.

Response: It is assumed that the commenter is asking the agencies to analyze an alternative that would use no lethal means of control and that would allow bison to exist with no restrictions on their distribution or population size. An alternative that contains such management strategies was considered in the development of the *Draft Environmental Impact Statement*, however, such an alternative would not meet the purpose of the long-term bison management plan and was therefore eliminated from full-scale analysis and consideration. For a further discussion on this topic please refer to the *Draft Environmental Impact Statement* (p. 112).

Representative Comment: 4978C

Issue 13: ***Brucellosis Eradication in Yellowstone National Park vs. Other Areas***

A Comment: The environmental impact statement should not assume brucellosis eradication in Yellowstone National Park would be as easy as in other places, and should comp are conditions in the park to show the differences. For instance, the park has policies requiring natural regulation; there is more accumulation of snow, winter temperatures are more extreme, the park is not fenced, and there are other wildlife in park. Yellowstone National Park is a very different challenge. Note also, even with intensive management of other herds, with fencing, branding, roundup, etc. it still took many years, often decades and involved drastic reductions in the herd during the interim.

Response: We agree that brucellosis eradication in the Yellowstone area would be difficult. The management actions taken in other park units (see "Bison: Brucellosis in the Yellowstone Bison Herd" for more information) did not have the goal of maintaining a "wild and free-ranging herd" because those units are small, fenced, or the herd itself is small. This is one of the reasons eradication of brucellosis in bison is not an objective of this plan, and the agencies have limited an objective of this plan to reducing seroprevalence as a commitment toward the eventual elimination of the disease in bison and other wildlife (see volume 1, "Purpose of and Need for Action: Objectives and Constraints," objective #4).

Representative Comment: 15420XI

Bison Alternative (AL-55)

Issue 1: ***The Bison Alternative***

A Comment: The *Draft Environmental Impact Statement* did not look at any alternative that emphasized natural regulation to control distribution and manage risk. It should analyze the "Bison Alternative," which would

1. Immediately close Yellowstone National Park to snowmobiling.

2. Not enforce a boundary — see above.

3. Provide no compensation for and mandatory closing of allotments — economic ramifications not analyzed for closing without compensation.

4. Provide options for private landowners — can have property fenced; can modify to nonbreeding; can agree to not run cattle for five years as negotiations on land acquisition or conservation easement take place (all compensated).

5. Do not vaccinate bison — increase in seroprevalence above what predicted in alternative 2 (vaccine assumed in all alternatives, including alternative 1).

6. Institute mandatory vaccination and testing for all cattle.

7. Educate and compensate other private landowners for damage by bison, increase landowner tolerance for bison.

8. Provide no vaccination, quarantine, or hunting of bison.

Response: Volume 1, "The Alternatives," provides a comparison of the features of the "Bison Alternative," as well as other alternatives submitted during the comment period on the *Draft Environmental Impact Statement.* To summarize, many of the features of the "Bison Alternative" are the same as phase 2 of alternative 2. For instance, the bison population would be naturally regulated; no capture, test, or slaughter operations are anticipated; no quarantine or hunting would take place; bison would be allowed to roam on all public lands in the designated alternative 2 boundaries; hazing would be used to keep bison off private land if their removal was requested; national forest grazing allotments in the alternative 2 boundary area would be modified; and many snowmobile trails would be closed to keep bison from using them as an energy savings mechanism. However, the "Bison Alternative" is notably different in not designating any boundary beyond which bison cannot cross. Without the satisfaction of this stated objective (see volume 1, "Purpose of and Need for Action: Objectives and Constraints" for more information), the risk of transmission to cattle would be unacceptably high. Although the "Bison Alternative" includes measures for private landowners, these would necessarily be voluntary as agencies do not have the power to mandate them. The impacts of closing grazing allotments are discussed in this volume under "Socioeconomics: Cost to Livestock Operators."

Representative Comment: 14714UU

B Comment: Analyze an alternative that incorporates the following features:

1. Montana requires ranchers on private land to either agree to fair market compensation of value of herd annually for five years while federal agencies and environmental organizations purchase or seek conservation easement(s).

2. Modify to nonbreeders, expenses or loss in revenue compensated by APHIS from brucellosis eradication money.

3. Construct bison-proof fence, vaccinate, annually test cattle — costs paid by public funds (APHIS for vaccine; U.S. Department of Agriculture and Montana Department of Livestock split annual testing) — only test if cattle and bison intermingle January to July.

Response: These options and elements have been addressed in volume 1, "The Alternatives," which provides a comparison of features of FEIS alternatives and other options that were considered. Conservation agreements are incorporated into alternative 2 and other alternatives on a "willing seller" basis. The modified preferred alternative establishes APHIS's role in assisting livestock operators with the costs of vaccination, testing, and monitoring under certain conditions and prescriptions. Construction of a bison-proof fence is addressed under volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation."

Representative Comment: 9382L

C Comment: Analyze the bison plan but seasonally separate bison and cattle, and ensure the population is controlled by natural factors only.

Response: The reason for seasonal separation of bison and cattle is the assumption that bison will leave Yellowstone National Park in the winter and return with the help of agency hazing the following spring. Therefore, cattle can graze in the summer on the same lands bison occupy in the winter. The "Bison Alternative" does not assume this, as far as we can tell, but allows bison to travel wherever they might (no boundary enforced, no agency management) throughout the year. Separation would not be possible given this scenario.

Representative Comment: 1804B

D Comment: In addition to the features of the Bison Plan, emphasize strategies to manage risk rather than eradicate bacteria in the selection of alternatives.

Response: We believe this combination would be equivalent to alternative 2 as presented in the *Draft Environmental Impact Statement*. Each alternative emphasizes risk management, and none aims to eradicate the bacteria. The modified preferred alternative emphasizes the management of the risk of disease transmission through an adaptive management strategy. While much is known about disease transmission, more is to be discovered. This is also true of bison vaccination, viability of the *Brucella* organism, and what, if any, additional tolerance the state of Montana and other concerned parties will have for bison movement outside the park. The modified preferred alternative seeks to manage risk by spatial and temporal separation of bison and cattle, vaccination of bison when safe and effective, and increased tolerance for bison outside the park under specific prescriptions and conditions.

Representative Comment: 9382F

E Comment: The Bison Plan (also the "Citizens' Plan" and "Plan B") do not "cut to the quick" — eradication of this disease in the Yellowstone National Park herd.

Response: Eradication of brucellosis in bison is not an objective of the bison management plan (see DEIS, p. 29, objective #4).

Representative Comment: 14939A

F Comment: Analyze an alternative that only prohibits motorized vehicle use in the winter in the park.

Response: Closing snowmobile routes or groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, thus establishing as near-natural conditions as possible for bison. It is also possible that closing groomed roads might have little or no effect, as bison may use river corridors or other means to exit, since the knowledge of lower elevation winter range appears to be passed along through generations (see "Bison: Ecology — Issue 6 for more information). Regardless, the use only of closed roads and no other management technique would result in the violation of several of the stated objectives in taking action. Please see response to issue 1A above.

Representative Comment: 5973A

Citizens' Plan (AL-53)

Issue 1: ***The Citizens' Plan***

A Comment: Analyze the "Citizens' Plan," which is alternative 3, with the following differences:

1. Allow no trapping, testing, or slaughter inside Yellowstone National Park, but allow it outside the park when needed to maintain either out-of-park carrying capacity or total herd goal size. Facilities sites to minimize impact on other wintering wildlife.

2. Include as SMAs Eagle Creek/Bear Creek, area along Yellowstone River to mouth of Yankee Jim Canyon, and on west side to Taylor Fork-Buffalo Horn drainage.

3. Encourage agencies to actively support legislation to return management of bison to Montana Fish, Wildlife and Parks Department outside of the park; also to support hunting in a sporting and fair-chase manner.

4. Keep healthy bison in the public domain; those passing quarantine go to governmental entities with experience and technical knowledge to trap, relocate, and manage bison; commit to disposal with governmental entities.

5. Use traditional wildlife management tools, such as relocating bison to Indian reservations, public lands, regulated harvest when population limits are exceeded on lands outside of the park, or if private property or human safety is threatened (from 2979- Phillips). Use capture and test facility to determine whether bison are seronegative and go to quarantine, or if facility is full and population limits outside the park or herd size limit have been seen exceeded, to slaughter (seropositives), research (seropositives), or released for hunt. If whole herd goal or out-of-park carrying capacity are not exceeded, only test animals causing safety threat on private land, no hunting.

6. Establish voluntary program to compensate landowners for damage to property from bison migration.

7. Provide incentives to private landowners to modify livestock operations to provide winter foraging opportunities for bison outside the park.

8. Support future changes in winter road-grooming if research shows current practices are harming bison.

9. Use pasture type quarantine and devise quarantine protocol similar to cattle that doesn't require bison to spend several years in quarantine.

10. Trap or tranquilize bison that cannot be hazed back into the park, and move them to quarantine. Use lethal control as last option.

11. Mandate vaccination of cattle within 20 air miles of the park or in SMAs.

12. Commit to only vaccinating bison when a safe and effective vaccine is developed and using as nonintrusive delivery as possible.

13. Use seropositive bison not slaughtered for research to answer questions.

14. Develop herd size limits based on ecological constraints of the habitat; minimum size recognizes winter habitat available in and outside the park, include demographic parameters as

well as genetic factors and include public lands outside the park available to bison. Then establish a "total herd goal" for public lands outside the park based on habitat capability, intraspecies competition, and constraints of the winter forage resource. Manage to this level through hunting and relocation, but never below minimum.

15. Commit to APHIS definition of low risk. Remove state veterinary discretionary authority. Make a tangible commitment.

16. Acquire winter range north of the park, but do not site quarantine here — value of land too high for bison and other wintering wildlife.

17. Create an interagency (tribal, federal, state, and public experts) team of wildlife professionals to meet on an annual basis to review bison and other wildlife populations, who would adaptively manage buffalo outside the park.

Response: Many features of the "Citizens' Plan" are similar to those in other alternatives analyzed during the EIS process. The agencies believe some of the features unique to the "Citizens' Plan" require additional analysis as they are within the objectives and constraints, satisfy the purpose of the plan and so would be considered reasonable, and have different environmental impacts than those described in the environmental impact statement. As far as we can tell, those features primarily concern the means of determining and controlling the bison population size. Other differences, such as taking a stronger stand on hunting or the APHIS definition of low risk, have no apparent analyzable distinct impacts. The features already analyzed in the environmental impact statement include: no capture, test, or transport to slaughter from inside the park (phase 2 of alternatives 2, 3, and 7); site capture facilities outside the park to minimize impact on other wildlife (phase 2 of alternatives 2, 3, and 7); SMA boundaries to Yankee Jim Canyon and Taylor Fork-Buffalo Horn drainage (phase 2 of alternative 2, steps 2 and 3 of the modified preferred alternative); the use of "traditional wildlife management tools," such as relocating proven seronegative bison to public lands or Indian reservations (see quarantine sections in alternatives 2, 3, 7, and the modified preferred alternative), or regulated harvest (e.g., hunting; see hunting sections of alternatives 3 and 4); incentives to private landowners to modify livestock operations in the form of changing to nonbreeding cattle, or sell easements or land to the agencies (see alternatives 2, 3, and 7); commit to APHIS definition of low risk (this was assumed in the analysis of alternatives allowing seronegative bison outside the park); support future changes to road grooming if research shows current practices are harming bison (alternative 3); continuing commitment to a safe and effective vaccine using nonintrusive delivery (see alternative 2, for example); acquire winter range north of the park, but do not site quarantine here (alternatives 2, 3, and 7 — siting of the quarantine will be examined in a separate NEPA process); using some seropositive bison for research.

Features that are different, but that have no distinct or analyzable environmental impact, include supporting legislation to return management to the Montana Fish, Wildlife and Parks Department; keeping bison in the public domain, mandatory vaccination of cattle within 20 air miles of the park or in SMAs (all ranchers within this distance already vaccinate cattle voluntarily); and creating an interagency group of wildlife professionals to adaptively manage bison outside the park.

The features that are different, and that have different environmental impacts from those analyzed in the environmental impact statement, are the use of a pasture type quarantine and less severe protocol; trapping or tranquilizing bison not amenable to hazing back into Yellowstone National Park; developing herd size limits based on ecological constraints not just of the park, but of SMAs as well; managing bison to achieve whole herd limits and ecological carrying capacity limits outside of the park; and removing the state veterinarian's discretionary authority. Except for tranquilizing bison, the impacts of each of these is addressed in this final environmental impact statement in detail in the appropriate section. For cost and logistical reasons, tranquilizing bison on a large scale is not considered feasible. It would be extremely difficult to transport tranquilized bison in much of the management area during the winter. Hazing is considered a much more realistic means of returning bison to the park, or removing them from private land if needed. Tranquilizing individual bison under specific circumstances is an option the agencies

would retain. The possible adverse impacts to any animal tranquilized in the field include the inability to capture a darted animal, injury, or even death if the tranquilizer is not tolerated well, or the dose is incorrect. These impacts are not expected to occur, nor is tranquilizing anticipated on any but an occasional basis to a few bison in any given winter.

Representative Comment: 14819XX

B Comment: In addition to those features shown above, the "Citizens' Plan" would:

1. Be in place for 10 years, reviewed when new scientific information is available. This should be true of any plan.

2. Do not capture, test, shoot, or remove bison to quarantine or slaughter from Yellowstone National Park.

3. Allow bison to use public lands within SMAs with minimal human interference (use alternative 2 boundaries for SMAs).

4. Enforce reasonable boundaries.

5. Scientifically base herd-size limits on interspecies ecology, range health, and population viability for public lands outside of the park. When additional public lands become available, have herd size limits reviewed by wildlife professionals from conservation community, tribes, and agencies.

6. Scientifically base minimum herd size — consider average winter habitat in and outside the park and winter severity — increase to 1,700 bison to include winter habitat outside the park.

7. To manage bison outside of the park, transfer live excess bison to public lands (including reservations) as population levels approach carrying capacity, or use regulated harvest not conducted by agency officials.

8. If conflicts occur with cattle on public land, have U.S. Forest Service change allotment to accommodate bison use; if no cattle, allow bison to remain with no intervention unless necessary to reach population objectives (then, hazing and capture).

9. Allow bison on public land, unless there is a threat to property or safety. Then haze or capture, test and remove to quarantine, research or slaughter [agency additions].

10. Encourage Montana, Idaho, and Wyoming to require vaccination in and adjacent to SMAs.

11. Have private and government entities establish a compensation fund for private property damage for ranchers abiding by management objectives of the plan.

12. Aggressively pursue winter range and incentives to modify operations on intermingled private land. Horse Butte and Church of the Universal Triumphant top priorities.

13. Use a pasture-type health certification facility.

14. Use a modified quarantine protocol.

15. Vaccinate with S/E vaccine, oral delivery. Use only if similar consideration for elk.

16. Encourage the concept of low-risk bison to be recognized and enforced by Montana.

17. Support research.

Response: Again, the features unique to this alternative include the 10-year time frame; treatment of bison on private property; requirement that vaccination of cattle occur in the three states adjacent to the SMAs; private property damage compensation for ranchers abiding by the objectives of the citizens' alternative; vaccination of bison only if elk are similarly vaccinated. All but the 10-year time frame are discussed elsewhere in response to comments on these specific management suggestions.

As to the suggestion of a 10-year time frame, we disagree this would be preferable for two reasons:

1. Many of the features required to begin phase 2 of the preferred alternative, or of other alternatives as well, would often take several years. Ten years would not be enough time to allow them to become fully operational. Further, because of the differences in agency mandates, this plan has taken many years to complete. Assigning a 10-year duration might not provide for cohesive management outside the park during the time a new plan was being prepared. This does not mean they wouldn't be managed, but simply that each agency could manage them in whatever way they saw fit in their own jurisdiction. Research on important topics is ongoing (see volume 1, appendix D). As it is completed, management strategies may have to be reconsidered. If environmental impacts were possible, a new NEPA document would be prepared to analyze the impacts of employing the new strategy regardless of the timeframe of the plan. To speculate for the sake of an example, if a safe and 100% effective bison and elk vaccine was developed and brucellosis eliminated from wildlife in the Greater Yellowstone Area, it would dramatically change how bison were managed outside the park.

2. The same is true for a cattle vaccine — if ranchers or agencies were sure cattle were immunized with a 100% effective vaccine, the issue of transmission would be moot. If either became available and was applied to such an extent that the disease appeared on its way to elimination during the 15-year life of this plan, the agencies would devise an entirely new plan or manage bison as they do other wildlife. The results of other research could be incorporated with no changes to the plan or environmental impact statement; for example, a more precise card test for seropositive bison would simply be used if developed. In other words, the agencies have all the flexibility of a 10-year plan in a 15-year plan.

Representative Comment: 14484H

C Comment: Analyze an alternative with the following features of the "Citizens' Plan":

1. Do not capture, test, hunt, or remove bison from Yellowstone National Park.

2. Change grazing allotment to accommodate bison.

3. Establish scientifically based herd size limits for bison outside the park (as you [agencies] have for inside the park).

4. Require mandatory vaccination for cattle grazing near the park.

5. Acquire key winter range through purchase or easements.

Response: As mentioned above, all of these features are analyzed in the environmental impact statement except for item 3, i.e., using ecological criteria to determine carrying capacity outside of the park. Carrying capacity inside the park was determined and used in several of the alternatives. Ecological carrying capacity in the SMAs outside the park is analyzed in "Bison: Vegetation/Vegetative Communities — Issue 3 (Carrying Capacity).

Representative Comment: 539A

D Comment: Analyze the "Citizens' Plan," which has the following features:

1. acquires property for winter range
2. reduces risk by seasonally separating bison and cattle
3. provides for use of public lands by bison
4. allows population to fluctuate naturally inside Yellowstone National Park based on scientific data

Response: All of these features have been analyzed in other alternatives. Alternatives 2, 3, and 7 envision the acquisition of property for winter range, and the modified preferred alternative already includes acquisition; all alternatives except alternative 5 use seasonal separation of cattle and bison; all alternatives except alternative 5 provide for use of public lands by bison; and all alternatives except 5 and 6 allow the population to fluctuate naturally inside the park, with estimates of the limits of the population size determined by scientific data.

Representative Comment: 882D

E Comment: Please analyze the following package, similar to the "Citizens' Plan":

1. Avoid quarantine, handling for vaccination, or other purposes.
2. Have a larger SMA.
3. Have scientifically based population goals outside Yellowstone National Park.
4. If exceeded, regulate by relocation to public lands or limited hunting.
5. Assist ranchers by vaccinating cattle near the park, not wildlife.
6. Manage wildlife through the use of professionals.
7. Provide incentives to livestock owners to provide winter forage opportunities on private lands, or acquire, if necessary, from willing sellers.

Response: Without specifying the size of the SMA, the only response we can offer is a generic one; that is, given the "Citizens' Plan" form of management, more bison would be accommodated outside the park with larger SMAs as long as the size of the entire herd did not exceed a set amount.

The particular combination of tools the above alternative specifies would leave few management tools for the agencies to control the population size or risk of transmission. Without the option for handling bison, relocation to public lands is not an option (see "Bison: Quarantine Operations — Issue 10 (Distribution of Live Bison). This leaves hunting as the only measure to control population size and distribution. Although hunting can be an effective tool to do both (see phase 2 of alternative 3, for example), limited hunting as you have specified would probably not stop the migration of bison out of the SMAs, leading to the problems described above for "Plan B" or the "Bison Alternative." Without capture facilities (e.g., handling) or vaccination of bison, no means to separate seropositive bison or to reduce prevalence of seropositive bison is available. Eventually, this scenario would result in some seropositive bison outside the management area and in contact with susceptible cattle, a situation the agencies believe violates several objectives and the purpose of the plan.

Representative Comment: 2408B

F Comment: Please analyze the idea of trapping bison on private property, and transferring seronegatives to tribal land where they would be safe until they could be returned to public lands.

Response: See "Bison: Quarantine Operations" and "Bison: Distribution (Live)."

Representative Comment: 3138B

G Comment: Please analyze the following alternative, which is similar to the "Citizens' Plan":

1. No slaughter.
2. No Department of Livestock management.
3. Coordinate with Native American tribes.
4. Only send live bison to public entities or tribes.
5. A less severe, costly, inhumane quarantine protocol.
6. Mandatory vaccination for cattle in Wyoming and Montana if near Yellowstone National Park.
7. No trap, test, quarantine, or shipping facilities on public lands or in immediate vicinity of the park.
8. U.S. Forest Service modify grazing permits to permit unrestricted bison access.

Response: The "Citizens' Plan" appears to allow slaughter of seropositive bison, does not specify that capture facilities would not be on public lands or in the immediate vicinity of the park, or that bison would have unrestricted access on U.S. Forest Service lands. However, the environmental impact statement analyzes alternatives that do not include slaughter of bison (phase 2 of alternatives 2 and 3); have no capture facilities at all (phase 2 of alternative 2); and provide unrestricted access on U.S. Forest Service lands (phase 2 of alternative 2). Other features you describe are included in the "Citizens' Plan" and are analyzed in appropriate sections of this volume.

Representative Comment: 4748A

H Comment: Analyze the following alternative, similar to the "Citizens' Plan" and "Bison Alternative":

1. Close snowmobile routes, do not groom (bison and air/noise impacts).
2. Move seropositive bison, or bison exceeding carrying capacity, to tribal lands.
3. Acquire additional winter range.
4. Compensate cattle owners if they have losses related to a brucellosis outbreak tied to Yellowstone National Park bison.

Response: The unique features of this combination not already addressed include numbers 2 and 4. Bison from the Yellowstone herd can only be moved live to slaughterhouses or approved research or other facilities under existing APHIS regulations. See "Bison: Quarantine" for more information. No alternative is expected to result in a brucellosis outbreak, as susceptible cattle and bison are kept separate in all of them. If cattle and bison were allowed to intermingle, cattle could conceivably test seronegative, but be incubating the disease (see "Bison: Brucellosis Testing"). If this happens, the disease could spread much

further than just the herd where it was discovered. Therefore, the agencies have agreed prevention of the disease is the best method of managing the risk of transmission.

Representative Comment: 5544B

I Comment: Analyze the "Citizens' Plan" without mandatory cattle vaccination.

Response: The impact of mandatory vaccination would be negligible, since all livestock operators in the impact area now voluntarily vaccinate their cattle.

Representative Comment: 7721B

J Comment: Analyze the "Citizens' Plan," with particular focus on returning management of bison to wildlife managers and the use of public lands adjacent to Yellowstone National Park by bison.

Response: We are assuming the commenter means the management of bison outside the park should be returned to the Montana Department of Fish, Wildlife and Parks, rather than the Montana Department of Livestock. This issue is addressed extensively in this volume, "Objectives and Constraints: Legal and Policy Mandates." To summarize, the Board of Livestock's authority is established in Montana law as disclosed in volume 1, appendix E. In general, the Board of Livestock is obligated and has authority for the control of disease and the protection of the livestock industry from disease (MCA 81-2-102 and 81-2-103; see this volume, "Objectives and Constraints: Legal and Policy Mandates — Issues 1B and 1C for more information).

Representative Comment: 8872A

K Comment: The "Citizens' Plan" is oversimplified and assumes all the following:

1. Large SMA, but bison rarely frequent most of it.
2. SMA includes private land, developments, and even towns — not biologically or politically suitable.
3. How would a pasture-type quarantine removed from Yellowstone National Park area obtain federal or state approval?
4. Misleading to say tribes across the country ready and willing to take bison.
5. Makes light of disease factor by stating quarantine protocol could be simpler.
6. Movement outside the park is not natural, unless population exceeds carrying capacity — minimum of 1,700 likely to be too high and cause out-migration.
7. Saying no confirmed case of brucellosis transmission bison to cattle in the wild doesn't mean there is nothing to worry about.
8. If brucellosis can't be eradicated in bison without looking at elk, doesn't this mean transmission between species would occur? How different than bison to cattle?
9. Mandatory vaccination may have economic impacts as vaccinated cattle carcasses would be docked at slaughter facilities.

Response: Comments are addressed point by point, as follows:

1. The maps in the final environmental impact statement for each alternative include a crosshatched area that shows where bison are most likely to occur within the SMAs. It is true they tend to congregate in the lower-lying areas where forage is available, and it is only a rare occurrence when a single (usually bull) bison ventures into higher elevation and more severe terrain. This terrain provides an important topographical limit in many cases.

2. SMAs in the bison management plan also include private property, including a small subdivision on the west side of the park. Bison are removed from private property if the agencies believe they present a threat of transmission, or if property owners request they be removed. If bison occupy private land, we have to assume that it is biologically available; the landowner and Montana Department of Livestock determine whether it is "politically suitable."

3. The existing "Memorandum of Understanding" allows for the quarantine facility to be located in any of the states adjacent to the park. An additional NEPA process, as well as a possible state environmental impact process and additional permits, may be required to locate the quarantine facility.

4. The agencies have kept a list of tribes and organizations indicating willingness to accept healthy Yellowstone National Park bison (see this volume, "Consultation and Coordination: Cultural Resources — Archeology/Cultural Landscapes/Ethnography" for more information.)

5. Many commenters requested that a less severe quarantine protocol be analyzed (see this volume, "Bison: Quarantine Operations" for responses to this issue.)

6. The factors causing outmigration of bison are a subject of debate among experts (see this volume, "Bison: Population — Issue 1 [Support/opposition for establishing a population maximum] for more information).

7. As indicated throughout the final environmental impact statement and in this volume, the risk of transmission from free-ranging bison to cattle appears to be very low because of several factors, including the viability of *Brucella* outside the body and behavioral differences between bison and cattle. However, because brucellosis has been transmitted under confined and controlled conditions, it is biologically possible such transmission can occur and the agencies have managed for this possibility.

8. Behavioral and habitat differences between bison and cattle may be larger than between bison and elk; see this volume, "Wildlife: Brucellosis in Other Wild Ungulates" for more information.

9. See volume 1, "Environmental Consequences: Impacts on Socioeconomics — Summary of Benefits and Costs," for more information.

Representative Comment: 15316BB

L Comment: Analyze the "Citizens' Plan" or another that alters grazing allotments for fewer than 10 ranchers and 800 head of cattle affected rather than bison.

Response: The *Draft Environmental Impact Statement* has analyzed such an alternative. Please see alternative 2, phase 2.

Representative Comment: 5640E

M Comment: The environmental impact statement should be redrafted or a supplemental environmental impact statement prepared to incorporate the "Citizens' Plan."

Response: A supplement is prepared if substantial new information is presented or significant changes are made to the preferred alternative that have not already been analyzed in the environmental impact statement. We do not believe analysis of the few features of the "Citizens' Plan" that are different from those in one or more of the alternatives already analyzed in the environmental impact statement meets either of these standards.

Representative Comment: 2133A

N Comment: The "Citizens' Plan" wouldn't work because the herd would continue to grow, and you would have twice as many bison in 5 years or four times as many in 10 years. It would cost more tax money to buy property or feed them.

Response: Although it is inappropriate for the agencies to debate the features of the "Citizens' Plan," it does not appear that the bison population would grow past a set herd size. Several management tools, including hunting, quarantine, capture, test, and slaughter would be put into practice outside Yellowstone National Park if bison migrate and the herd is larger than the upper end of an ecologically derived carrying capacity.

Representative Comment: 2376B

O Comment: The agencies have violated the National Environmental Policy Act by not considering the "Citizens' Plan." It needs to be evaluated as a package, rather than in pieces of other alternatives.

Response: Each alternative in the environmental impact statement is evaluated for its impacts on several resources (see volume 1, "The Alternatives," table 13 for more information). If the impacts are the same as for other alternatives, this is stated. The same is true of the "Citizens' Plan," which is similar in many respects to a combination of alternatives 2, 3, 7, and the modified preferred alternative.

Representative Comment: 11409AA

P Comment: How much would the "Citizens' Plan" cost? Who would pay, and would additional taxes be required? Does it have provisions to reimburse private landowners for losses?

Response: Please contact the sponsors of the "Citizens' Plan," the National Wildlife Federation and Greater Yellowstone Coalition, plus many others, or consult the GAO (1999) report for this information.

Representative Comment: 16736A

Q Comment: All alternatives should be evaluated for consistency with the National Academy of Sciences recommendations. The "Citizens' Plan" is consistent with the following:

1. Vaccinate cattle to reduce risk.
2. Vaccinate, rather than capture/test/slaughter bison.
3. Provide no roundup or facilities inside the park, such as in alternatives 5 and 6, which National Academy of Sciences notes would be unacceptable to the public.
4. Establish perimeter management zones — monitored in progressively vigorous ways.
5. Eventually stop bison altogether unless private lands are acquired over a much larger area.
6. Better to take bison to heart of original range — Great Plains — if excess.

Response: The National Academy of Sciences report (NAS 1998) is a valuable synthesis of information from the scientific community. This information was available to all analysts working on the EIS team, and some of it is cited in the environmental impact statement. Particular statements or recommendations from the report may be used in responding to questions and comments from the public; however, at this time its conclusions are not considered to be a superior guiding force to the agencies' own objectives and purpose and need statement in the environmental impact statement.

Representative Comment: 14819XX

Bison

bison

Capture/Test/Slaughter Operations (BI-5)

Issue 1: ***Testing***

A Comment: Only those bison that prove to be tissue positive for the bacteria should be sent to slaughter.

Response: The bacterium that causes brucellosis, *Brucella abortus*, resides in certain lymph nodes and sometimes in the udder and in the reproductive organs of infected animals. The lymph nodes most likely to harbor the organism are either extremely difficult or impossible to biopsy from live bison. The organism may be located in only a small part of the lymph node, and the likelihood of a biopsy needle collecting that exact piece is low. For these and other reasons the agencies use serologic tests (see "Bison: Brucellosis Testing" for additional information).

Representative Comment: 102C

B Comment: All bison wandering beyond the boundaries of Yellowstone National Park should not be subject to test and slaughter procedures but should be captured and transported back into the interior of the park.

Response: The transport of bison from capture facilities to the interior of the park was attempted in the northern part of the park in the winter of 1996–97. It was not successful. The conditions that had precipitated the movement in the first place were still occurring and the animals rapidly returned to lower elevation areas where they were subsequently recaptured. While movement of a small number of individual animals may be technically possible, the movement of a significant number of bison as a routine operational program would be very expensive and is not likely to succeed. Further, it is dangerous for both the bison and the people conducting the operation, particularly if over-snow transport is attempted.

Representative Comment: 522D

C Comment: Managers should test all bison in Yellowstone National Park and slaughter all positive carriers.

Response: This is the approach adopted in both alternatives 5 and 6.

Representative Comment: 8826A

D Comment: Current field tests for brucellosis are grossly inaccurate, thus resulting in the slaughter of several bison that proved to test negative in more accurate laboratory tests. The inaccuracy of these tests may lead to the removal of animals that possess a natural resistance to brucellosis and that capture, test, and slaughter operations should be discontinued until a more accurate field test is developed.

Response: Recent research has shown that *B. abortus* bacteria can be cultured from approximately 46% of bison that test positive for exposure to brucellosis in serologic tests (Roffe et al. 1999). This is approximately equivalent to the successful culture rate in infected cattle. In cattle and bison with field strain *B. abortus* infection, the correlation between serology and the ability to culture the organism is well below 100% due to a number of factors such as individual animal variation and culture technique. Negative serologic test results, however, do not equate to the absence of infection (NAS 1998). More research is needed to determine what relationship exists between the presence of bacteria and the ability or likelihood of an individual bison being infectious. Research is currently underway to develop more accurate field testing techniques for bison. For the most part, only seropositive bison will be selectively removed. Seropositivity does not equate with natural resistance to brucellosis infection. Natural resistance is determined genetically, through an unknown number of genes, most of which have not yet been identified. Bison that are genetically resistant to brucellosis are virtually always seronegative; when exposed to the *B. abortus* antigens, they have either no detectable serologic response or one that is transient and barely detectable. In the alternatives that call for various levels of capture, test, and slaughter

operations, the possibility that some naturally resistant, pregnant female bison may be removed from the population does exist, as in the interim plan, in which all pregnant animals are removed.

Representative Comment: 9025, 15420NI, 15420UI

Issue 2: *Capture Facilities*

A Comment: Remove bison capture facilities within and outside Yellowstone National Park.

Response: In phase 2 of alternatives 2 and 3 at least some capture facilities would be dismantled. If alternative 2 was chosen for implementation, bison would not be captured or slaughtered by the agencies, and all existing capture facilities would be dismantled. Implementation of alternative 3 would result in the removal of the existing capture facilities in the Duck Creek and Horse Butte areas, and the relocation of the Stephens Creek capture facility to a location north of the park.

Representative Comment: 150E, 280B

B Comment: Bison capture facilities are inappropriate and should not be placed on any public or private lands.

Response: The agencies have included in phase 2 of alternative 2 the removal of all existing capture facilities both inside and outside Yellowstone National Park. If this alternative was chosen for implementation, the agencies would not use capture, test, and slaughter operations to control bison distribution and population levels, and would use lethal control only where human health was in immediate danger, on private land at the request of the landowner, or in areas beyond the SMA boundaries. Other alternatives include the use of capture facilities for added flexibility in the management of Yellowstone bison. In those alternatives, capture facilities enable the agencies to ensure spatial and temporal separation of bison and cattle as well as facilitate vaccination and possible shipment of bison to approved quarantine facilities.

Representative Comment: 609F, 894 D

C Comment: All bison capture, test, and slaughter operations should be done only in areas outside Yellowstone National Park boundaries.

Response: Phase 2 of alternatives 3 and 7 calls for the removal of the capture facility inside the park and relocating it to a suitable location north of the park near Yankee Jim Canyon. In this phase of the alternatives, the existing capture facilities outside the park near the west boundary would also be removed. If either of these alternatives was chosen for implementation, all capture, test, and slaughter operations would be conducted at a capture facility north of the park boundary.

Representative Comment: 1964C

D Comment: The Stephens Creek capture facility should be used to maintain a target bison population, and all bison captured at that facility should be transferred to facilities on Native American reservations where all testing, slaughter, quarantine, and vaccination operations would occur.

Response: Most of the alternatives analyzed include the continued use of the Stephens Creek facility to hold overwintering bison when population numbers are low, or when winters are particularly harsh and significant losses are anticipated. These bison are released back into the park in the spring. Since some bison are affected with brucellosis, live bison can only be transported to specified locations in the APHIS Brucellosis Eradication Uniform Methods and Rules; to date these locations are primarily slaughtering facilities. However, seronegative bison may be available to a quarantine facility that may be established on a Native American reservation at a future date (see "Bison: Distribution (Live)" and "Bison: Quarantine Operations" in this volume for more information).

Representative Comment: 9005B

E Comment: Capture facilities should provide individual animals room to move without being in danger of injury from themselves or other bison.

Response: The agencies separate bison in the capture facility to prevent or minimize injury. Please see "Bison: Humane Treatment" in this volume.

Representative Comment: 17807E

F Comment: If the capture facility at Stephens Creek was not evaluated in a previous environmental assessment or environmental impact statement, the impacts of the facility should be evaluated in a supplemental environmental impact statement.

Response: The capture facility at Stephens Creek was evaluated in an *Environmental Assessment* for the *Interim Bison Management Plan* that was released for comment in December 1995. The agencies received 260 comments from state and federal agencies, Native American tribes, organizations, and individuals during the 42-day comment period. A finding of no significant impact was signed and released on August 9, 1996.

Representative Comment: 11409A

G Comment: Please provide information on the use of the Stephens Creek capture facility during the winter of 1997–98, including (1) number of bison captured, (2) age and sex, (3) number of seropositives sent to slaughter, (4) number of seronegatives held and released back into Yellowstone National Park in the spring, (5) where were animals held, (6) how many animals can be held, and (7) how are seronegative animals being held kept separate from new animals entering the facility.

Response: During the winters of 1997–98 and 1998–99 no bison were captured at the Stephens Creek capture facility. Although not originally designed as a holding facility, seronegative bison may be held in holding pastures adjacent to the capture facility and released into the park in the spring. The pastures may hold 120–150 bison. Seronegative bison that are being held for subsequent release are held in a separate pasture in order to eliminate contact with bison entering the capture facility.

Representative Comment: 11409A

H Comment: A capture facility should be established at Horse Butte.

Response: On December 14, 1998, an *Environmental Assessment* was released for the establishment of a capture facility at the Horse Butte location. On March 17, 1999, the U.S. Forest Service issued a special use permit to the Montana Department of Livestock for the installation, maintenance, and operation of a temporary, portable bison capture facility. The facility was completed, and capture operations were conducted during the spring of 1999. As of June 1, 1999, the facility had been used to capture and test a total of 69 bison.

Representative Comment: 11479I

Issue 3: ***Cessation of All Capture, Test, and Slaughter Operations***

A Comment: Bison should not be subject to capture, test, and slaughter.

Response: Over 19,000 comments were received from the public opposing the use of capture, test, and slaughter operations. The agencies acknowledge the opinion of the commenters and have included in step 3 of the modified preferred alternative the release of untested bison into management zones in both the western and northern boundary areas. It is anticipated that capture facilities would not be used during

most years when step 3 is in effect, as few enough bison would exit the park that the use of capture, test, and slaughter operations would not be needed (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts on the Modified Preferred Alternative" for more information).

Representative Comment: 11A

B Comment: The capture of bison in and adjacent to Yellowstone National Park is in direct violation of federal law and should be stopped immediately.

Response: We respectfully disagree. The Ninth Circuit Court recently upheld the implementation of the National Park Service's *Interim Bison Management Plan*, which includes the use of capture, test, and slaughter operations. In alternative 2, the agencies have presented a plan to manage bison that would not use capture, test, and slaughter operations. If alternative 2 was chosen for implementation, lethal control would be used only where human health was in immediate danger, on private property at the request of the landowner, or in areas beyond the SMA boundaries.

Representative Comment: 5633A

Issue 4: *Capture, Test, and Slaughter Operations*

A Comment: The agencies should implement an aggressive capture, test, slaughter, and vaccination program.

Response: Both alternatives 5 and 6 in the environmental impact statement include these elements. While alternative 5 relies primarily on whole-herd capture, test, and slaughter operations, with vaccination as a follow-up strategy, alternative 6 emphasizes vaccination first, with capture, test, and slaughter operations occurring in a second phase. All alternatives include vaccination, although the modified preferred alternative sets specific dates and goals for phased vaccination based on ongoing research. It is also important to note that implementing alternatives 5 and 6 would result in some large-scale adverse impacts, including major declines in the bison population, decreased winter recreation opportunity, and possible major adverse impacts on some threatened and endangered species.

Representative Comment: 2029E

B Comment: The analysis of the reduction in seroprevelence as a result of capture, test, and slaughter operations is unrealistic. The reduction in seroprevelence cannot be accomplished as rapidly as presented in the *Draft Environmental Impact Statement* as long as the bison population exceeds 1,200.

Response: Estimating the reduction in seroprevalence likely to result under each alternative is made difficult by the complexity of the modelling effort required and by the lack of some quantitative information about transmission rates, seroconversion rates, bacterial persistence, and "recovery" rates among bison. An additional difficulty is the lack of information about the effectiveness of a bison vaccine, which has not yet been fully developed and tested. Given these difficulties, assumptions based on the best available data were used to develop predictive models in order to estimate environmental consequences of all alternatives. The reductions in seroprevalence rates under each alternative as predicted in the *Draft Environmental Impact Statement* (see volume 1, "Environmental Consequences: Impacts on Bison Population") were based on the information currently available, incorporated into a simple, deterministic model. These results were similar to those from a computer simulation used to predict the potential effectiveness of various bison and brucellosis management programs in Grand Teton National Park (Peterson et al. 1991). A more complex stochastic population model was developed after the *Draft Environmental Impact Statement* was completed, and the results have been incorporated into the analyses of each alternative. For alternative 5, whole herd test and slaughter operations that captured 90% of the bison population each year were predicted to reduce seroprevalence to about 0.1% in about four years and would have a major negative effect on the bison population. In about 20 years, however, bison seroprevalence would likely return to the higher seroprevalence levels observed prior to test and slaughter

because of the reinfection potential from elk. As such, remote vaccination of bison must continue for alternative 5 to maintain the lower seroprevalence. An additional modelling effort (J. Gross, USGS-BRD, unpubl. data) suggests that conducting test and slaughter operations on more than 80% of the bison population annually could reduce seroprevalence to roughly 1%–2% within approximately 4 years. According to this model, however, such actions would also reduce the bison population by approximately half during that time period.

Representative Comment: 5638G

C Comment: A capture, test, and slaughter program does not substantially reduce the risk of transmission from bison to cattle, as only a small portion of the bison herd is tested each year.

Response: Please refer to the response to other comments on capture, test, and slaughter operations for information regarding the effectiveness of test and slaughter operations in reducing the seroprevalence rate in Yellowstone bison. All alternatives rely primarily on separation of bison and cattle in space and time to reduce the risk of transmission of brucellosis.

Representative Comment: 10575D

Issue 5: ***Additional Analysis Needed or Inaccurate Analysis Presented***

A Comment: The agencies need to provide an analysis of alternative winter snowmobile access from West Yellowstone, Montana, in alternatives that propose the construction of capture facilities at Seven-Mile Bridge.

Response: The DEIS alternatives that include a capture facility at Seven-Mile Bridge do not include provisions for providing alternate snowmobile routes to and from West Yellowstone, Montana. Based on visitor data collected between 1994 and 1998, an average of approximately 60,000 visitors per year entered the park through the west entrance from December to March. The majority of these visitors were snowmobilers, which constituted 89% of the total visitors entering through the west entrance. Between December and March, months when the park is open to winter use, an average of approximately 14,000 snowmobilers per month entered the park through the west gate. The presence of the facility would result in the road's being plowed in the winter from the west gate to Seven-Mile Bridge. This would have a major negative impact on winter recreation, as access to Old Faithful, a popular destination, would be cut off. In a survey of winter visitors conducted in 1995, Old Faithful was the place most visited by Yellowstone visitors (76%), followed by Madison (62%; Littlejohn 1996). The impacts of this alternative to snowmobile users and to the snowmobile industry in West Yellowstone are analyzed in volume 1, "Environmental Consequences: Impacts to Recreation" and "Impacts to Socioeconomics."

Representative Comment: 15543EI

B Comment: Alternatives containing capture, test, and slaughter operations would lead to the domestication of Yellowstone National Park bison and do not fulfill the objective of maintaining a "wild and free-ranging" bison herd.

Response: The agencies have defined "wild and free-ranging" as "not routinely handled by humans" and able to "move without restrictions within specific geographic areas" (see DEIS, p. 28). The agencies do not believe that the infrequent use of capture, test, and slaughter programs would constitute routine handling or lead to the domestication of the herd.

Representative Comment: 102C

C Comment: The *Draft Environmental Impact Statement* grossly overestimates the potential for successfully capturing virtually all the bison in Yellowstone for a capture, test, and slaughter program.

Response: Although alternative 5 states that the agencies assumed the ability to capture at least 95% of the herd annually for three years, the agencies acknowledge the commenters' opinion that this may overestimate the ability of the agencies to capture bison. It is indeed possible that factors such as topography and cover may reduce the ability of the agencies to move bison to capture locations. If the agencies were unable to capture 95% of the bison each year, it is likely that the operation would be extended for one or more years, or that a greater number of untested bison would be shot following the capture, test, and slaughter operations. However, alternative 5 was designed with nine different capture facilities distributed throughout the park to increase the likelihood that most of the population could be captured annually. This would require intense operations during the time of year that most bison are congregated at lower elevations and would involve intrusive measures such as intense helicopter operations. See also response to issues 1B and 4B above.

Representative Comment: 15420TI

D Comment: The agencies have failed to analyze the long-term impacts of operating the Stephens Creek capture facility in the context of declining pronghorn and mule deer populations.

Response: Observations during the winter of 1996–97, the only winter in which the Stephens Creek capture facility has been used, indicated that pronghorn were displaced up to a half-mile away from the area occupied by the facility (Caslick and Caslick 1997). Coyotes are known to have killed two pronghorn in association with the wing and pasture fencing, and an additional two pronghorn mortalities may have also resulted from coyotes chasing pronghorn into or along the fences (NPS, unpubl. data). As noted in volume 1 ("Environmental Consequences: "Impacts on Other Wildlife — Impacts Common to All Alternatives, Pronghorn"), "because of the small size and vulnerability of this population, the loss of a few individuals could have moderate to major impacts on the population as a whole." Prior to construction of the capture facility, this population was estimated to have an approximately 18% chance of going extinct within the next 100 years, a level generally considered unacceptable in the conservation biology literature (Goodman 1996). The presence and operation of the capture facility in combination with other pressures on the pronghorn population (e.g., predation, climate, limited available winter range) could cause the population, which has decreased in numbers in recent years, to decline further. Two research projects are currently underway to better understand the factors influencing pronghorn population dynamics: one will determine pronghorn fecundity rates and fawn mortality rates and sources, and the other will study pronghorn habitat use and determine whether use patterns are altered by displacement by humans or other animals. In the Gardiner Valley and northern portion of Yellowstone National Park mule deer numbers through 1996 had not declined as had many other mule deer populations in the region, although the harsh winter of 1996–97 apparently depressed population numbers and recruitment for 1–2 years (Lemke, MDFWP, unpubl. data). Counts from 1998–99 show increased survivorship and recruitment, indicating population recovery from that climatic event (Lemke, MDFWP, unpubl. data). It appears that climatic factors and natural mortality are the major influences on the mule deer population in this area (Lemke, MDFWP, unpubl. data). Mule deer do not appear to have made significant use of the area near the Stephens Creek capture facility for at least 10 years prior to its construction or in the three years since (Gogan, USGS-BRD, pers. comm.; MDFWP, unpubl. data). Therefore, it is unlikely that the continued presence or operation of the facility would impact the mule deer population. Alternatives in which additional winter range would be acquired north of the park boundary could potentially mitigate for the effects of the capture facility on pronghorn, and could benefit mule deer by providing additional winter range. See also "Wildlife: Predators and Scavengers/Ungulates" in this volume.

Representative Comment: 15420VI

E Comment: The *Draft Environmental Impact Statement* is incorrect in stating that regardless of the alternative, few bison would be removed during years when few bison migrate (see DEIS, p. 200). In-park capture, test, and slaughter operations do not depend on, and in fact may prevent, migrations. Alternatives that propose such operations would result in many bison being killed regardless of migration.

Response: The commenters are correct in stating that lethal actions associated with in-park capture, test, and slaughter operations as proposed in alternatives 5 and 6 do not rely on the migration of bison. However, "Environmental Consequences: Impacts on Bison Population — Impacts Common to All Alternatives," acknowledges this and states, "Except for alternatives 5 and 6, all lethal actions occur in response to stochastic events."

Representative Comment: 15420UI

Definition of Low Risk (BI-6)

Issue 1: ***Federal vs. State Definition of Low Risk***

A Comment: Montana and other states should accept the federal government definition of low risk.

Response: APHIS or the other federal agencies involved in this plan are not in a position to dictate policy to state veterinarians. The agencies have asked Montana to accept the federal low-risk definition. However, state officials have indicated that "Montana has responsibilities to state laws and regulations and for the economic health of the state. It also has the responsibility and authority to manage bison that enter nonpark areas of Montana. These responsibilities are Montana's and cannot be delegated to any other agency." APHIS has stated that, should Montana accept the definition and should a state contemplate import sanctions against Montana cattle because of that acceptance, APHIS would attempt to convince the state that such sanctions are not supported by accepted science and would not be needed to protect their livestock. No state has additional import restrictions on Montana cattle at this time, and Montana has managed the risk of brucellosis transmission by maintaining separation of bison and cattle.

Representative Comment: 14432E, 7615A

B Comment: All states except Montana have accepted this definition.

Response: There is no mechanism in place to acknowledge acceptance of the low-risk bison definition by states. However, the state veterinarians of Montana and Idaho have rejected the low-risk definition in writing.

Representative Comment: 10475AE

C Comment: If Montana accepted the APHIS low-risk definition, it would be the best way to ensure that other states respect Montana's brucellosis class-free designation.

Response: The U.S. Animal Health Association members (which includes many state veterinarians) do not all agree with the low-risk definition. This suggests that Montana's acceptance of the definition would not be sufficient to ensure that all other states would respect Montana's brucellosis class-free designation or refrain from imposing import sanctions on Montana cattle if it accepted the definition. However, as noted above, should Montana accept the definition and should a state contemplate import sanctions against Montana cattle because of that acceptance, APHIS would attempt to convince the state that such sanctions are not supported by accepted science and would not be needed to protect their livestock.

Representative Comment: 15707D

D Comment: Several of the alternatives in the *Draft Environmental Impact Statement* would impose a revised definition of "low-risk" bison on the state of Montana. The revised definition would result in large numbers of brucellosis exposed or infected bison in expanded SMAs where the potential contact with cattle would be increased.

Response: Presumably this comment refers to the federal definition of low-risk bison; there is no revised version of this definition in any of the alternatives. Low-risk bison are those bison that do not present a significant risk of transferring brucellosis to livestock through environmental contamination — bulls, yearlings, calves, and postparturient female bison that have live calves and have totally passed all birth membranes. This definition applies to untested bison for which trapping attempts have been unsuccessful within the SMAs (as defined in certain EIS alternatives) in the area adjacent to the western boundary of the park. Since there is temporal and spatial separation of bison and cattle, there would not be any contact between the species.

Representative Comment: 11121M

E Comment: The *Draft Environmental Impact Statement* inaccurately assumes that other state animal health officials will accept Montana cattle if this definition is imposed on Montana.

Response: APHIS has defined low-risk bison as those bison that do not present a significant risk of transferring brucellosis to livestock through environmental contamination — bulls, yearlings, calves, and postparturient female bison that have live calves and have totally passed all birth membranes. This definition applies to untested bison for which trapping attempts have been unsuccessful, within the SMA (as defined in certain EIS alternatives) in the area adjacent to the western boundary of Yellowstone National Park, where there is temporal separation of cattle and bison. This temporal separation, in combination with only allowing the above age/sex/reproductive classes of bison and only when they can not be captured, will greatly reduce the risk of transmission through environmental contamination. Accordingly, for the modified preferred alternative, APHIS has stated that should another state contemplate imposing sanctions against Montana and those sanctions are not supported by accepted science, APHIS would attempt to convince the state that such sanctions would not be needed to protect their livestock.

Representative Comment: 14305L

F Comment: The final plan should recognize the federal agencies' position regarding low-risk bison.

Response: The final environmental impact statement (as did the *Draft Environmental Impact Statement*) focuses on preventing brucellosis transmission from bison to cattle by ensuring spatial and temporal separation of all Yellowstone bison, regardless of risk status, and cattle. Spatial and temporal separation are designed (1) to prevent commingling of bison and cattle, and (2) to ensure that any live *B. abortus* shed by bison will not survive to the time when cattle occupy that area.

Representative Comment: 15367T

G Comment: The proposed definition of low-risk bison is not good. The only way any bison can be determined as low risk is by testing, and this cannot be accomplished with a visual examination.

Response: The bison included in the low-risk definition are those that do not present a significant risk of transferring brucellosis to livestock through environmental contamination. Their low risk is tied to their age, sex, and reproductive status; the temporal separation between them and cattle; and their limited numbers since only uncaptured bison are included. Even if they are infected, they should not shed more than incidental amounts of the bacteria. Furthermore, these releases do not attract other bison, like newborn calves or aborted fetuses apparently do. Therefore, these particular age and sex classes are unlikely to pose a risk of environmental contamination, regardless of whether they test seropositive or seronegative.

Representative Comment: 14820F

Issue 2: ***When and Where Low-Risk Bison Should be Allowed Outside the Park***

A Comment: The APHIS low-risk bison definition would allow some contact with livestock outside the park without risk to Montana's brucellosis class free status.

Response: Managing the risk of brucellosis transmission from bison to cattle relies primarily on ensuring a spatial and temporal separation between bison and cattle. Therefore, no contact with livestock is contemplated. However, some bison would be allowed outside the park in some alternatives during the winter, when cattle are not present. As noted in volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," APHIS has indicated "any of the alternatives outlined in the environmental impact statement would be sufficient to prevent the actual transmission of disease to

domestic livestock. Therefore, APHIS "would not downgrade the brucellosis status of Montana based on the mere presence of bison migrating out of Yellowstone National Park into special management areas [SMAs]," or areas outside the park, as indicated by the commenter.

Representative Comment: 555E

B Comment: Low-risk bison should be allowed free movement like elk and other wildlife.

Response: The agencies are committed to managing bison as other wildlife are managed, recognizing that, unlike other wildlife, a major component of managing Yellowstone bison is related to the risk of disease transmission to cattle. Although elk also pose some risk of transmitting brucellosis, the low seroprevalence rate in northern Greater Yellowstone Area elk herds suggests the risk is lower than from bison. Therefore, elk in the Montana portion of the Greater Yellowstone Area are not considered to present enough of a risk of transmission to warrant management actions like those proposed for bison, and are allowed free movement (see "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information).

Representative Comment: 10475AE

Issue 3: ***Transmission by Certain Age/Sex Classes of Bison***

A Comment: Why are bison bulls, calves, and nonpregnant cows killed, since they pose no threat of brucellosis transmission or are incapable of spreading the disease. Isn't it true that for transmission to occur from bison to cattle, cattle would have to consume infected afterbirth from bison, and therefore bison bulls and calves are incapable of spreading the disease.

Response: All bison in the Yellowstone herd are considered exposed to brucellosis and are assumed therefore to represent some risk of transmission to cattle should spatial and temporal separation not be maintained. There is little doubt that the primary means of transmission is by ingestion, from birth tissues, birth fluids, neonatal calves, and aborted fetuses that are contaminated with *B. abortus.* This is why certain classes of bison are considered to pose a low risk of environmental contamination. However, this does not mean environmental contamination is not possible, e.g., from contaminated urine, contaminated feces, a draining brucellosis abscess, or an infected carcass; transmission to calves via milk or across the placenta; or routes as yet unknown. Although the transmission potential of infected bulls is believed to be quite small, it remains unknown. For these reasons, the agencies have measures to ensure temporal and spatial separation of brucellosis-affected bison and uninfected cattle.

Representative Comment: 1207B

B Comment: Why are low-risk bison — particularly bull bison — not allowed outside the SMAs boundaries when cattle are not present in those areas outside the SMAs; the environmental impact statement must include and analyze an alternative that would allow low-risk bison to use lands outside of the SMAs.

Response: Bison will be permitted in certain areas outside Yellowstone National Park where bison control activities can maintain temporal and spatial separation of cattle and bison. Several alternatives, including the modified preferred alternative, allow low-risk bison to use lands outside the park. However, beyond the boundaries of these areas, cattle are frequently present all year; therefore bison are not permitted in these areas.

Representative Comment: 15420Z

C Comment: Bison with nonreproductive tract infection do not generally pose a risk of transmission to elk or cattle. The environmental impact statement should acknowledge these low risks and accommodate bull bison outside the park.

Response: An informational report, *Risk of Transmission of Brucellosis from Infected Bull Bison to Cattle*, was prepared by the Greater Yellowstone Interagency Brucellosis Committee (GYIBC). It notes that none of the studies on brucellosis transmission from bovine bulls reported transmission from infected bulls to cows during normal coitus. The report also cites a study concluding that shedding in the semen of bison is extremely rare. The report itself concludes that due to limited data documenting the presence of *B. abortus* in bison semen, "the risk of transmission from bull bison, though logically small, cannot be entirely eliminated on existing information." The National Academy of Sciences report also notes the risk of transmission from bulls to cattle appears to be "vanishingly small" (NAS 1998). Although these reports conclude the risk of transmission is small even from direct contact between bison bulls and cattle, all alternatives call for the spatial and/or temporal separation of bison and cattle. Because bull bison, calves, or postparturient female bison (with newborn calves and who have passed all membranes) do not present a significant risk of transferring brucellosis to livestock through environmental contamination, the federal agencies agree that if they cannot be captured and tested, they fall into the low risk category and should be allowed out of the park under certain conditions stated in the alternatives (see volume 1, appendix G). The state of Montana disagrees and has presented the rationale for their disagreement in the environmental impact statement (see volume 1, appendix G).

Representative Comment: 15420ZZ

Issue 4: *Low-Risk Bison and Testing*

A Comment: In 1996–97, less than 3% of slaughtered bison showed signs of active infection, yet bison have still been shot before being tested for brucellosis when they leave Yellowstone National Park boundaries.

Response: It is possible that only a relatively small percentage of bison in the park show obvious signs of an active infection at any given time. However, this does not mean that others, particularly those testing seropositive for exposure to *B. abortus*, are free of the bacteria. Studies done on the Yellowstone herd indicated that, at the time, about 50% tested seropositive. Of this 50%, different studies using different methods and subpopulations of bison have found from 12% (using all bulls exiting the park in the winter of 1998–99) to 46% (using all pregnant female bison) also test "culture positive" for the actual presence of the bacteria (see "Bison: Brucellosis Transmission and Public Perception," and "Brucellosis Testing" for more information). Also, in the winter of 1996–97 a year-round cattle ranch operated on private land near the park boundary. Because some bison do carry the bacteria (as indicated by the studies described above) and therefore posed a risk to the cattle on this land, they were captured and shipped to slaughter or shot if they crossed this boundary to ensure transmission did not occur. The modified preferred alternative works in adaptive management steps to reduce the number of bison being killed.

Representative Comment: 1207B

B Comment: Continue studies on bison that test positive for brucellosis, because not all positive-testing bison are carrying the disease in an active and contagious form.

Response: A study is underway on the epidemiology and pathogenesis of brucellosis in Yellowstone bison. See "Bison: Brucellosis Transmission and Public Perception" and "Brucellosis Testing" for more information. However, although seropositive bison may not be actively contagious at a particular time, seropositive pregnant female bison have the potential of becoming infectious usually just before or after a birth or abortion event.

Representative Comment: 14947B

Issue 5: *Accept the Low-Risk Management Techniques of "Plan B"*

A Comment: In "Plan B," low-risk bison are hazed away from private lands when cattle are present, or cattle operations are fenced with bison-proof fencing to prevent contact if cattle owners within the conflict zone insist on having cow-calf operations and will not accept compensation.

Response: The agencies believe contact between Yellowstone bison and susceptible cattle presents an unacceptable risk of transmission, and the term "low risk" is used to describe certain classes of bison that present less chance of environmental contamination after they leave the area. This means low-risk bison will not be present where there are cattle under normal circumstances. Hazing bison off private lands is an option under all alternatives; such hazing is without regard to bison age/sex class. At the discretion of the landowners, bison could be shot or removed. Nothing in the environmental impact statement prevents (or requires) the use of bison-proof fencing, although it is considered impractical for fencing large perimeters, such as a park boundary, for instance (see volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Issues Considered But Not Evaluated Further" section for more information).

Representative Comment: 7615A

Issue 6: *Zero Tolerance or Zero Risk*

A Comment: APHIS has taken a zero tolerance position regarding bison.

Response: Although it is unclear what the commenter means by "zero tolerance," if this refers to allowing bison outside the park, the commenter is incorrect. In fact, APHIS strongly encourages that bison be permitted to move to certain areas outside the park so long as a spatial and temporal separation of bison from cattle is maintained. This separation must be maintained in such a way that the risk of brucellosis transmission from bison to cattle is eliminated, and as indicated in the environmental impact statement, APHIS believes all alternatives meet this condition.

Representative Comment: 13021L

B Comment: Insistence on zero-risk is not appropriate in the case of brucellosis because it is not deadly, and it does not have potentially devastating consequences**.**

Response: Though rarely fatal in humans, *B. abortus* infection in humans is a serious disease and can be debilitating. Brucellosis does have potentially devastating consequences. Some farmers and ranchers have lost their livelihoods because they could not sustain the economic effects of having their cattle herds depopulated or quarantined. Billions of dollars have been spent over 60 years to eradicate this disease in the United States. At this time, the disease is almost eliminated in cattle. The modified preferred alternative proposes several adaptive management steps that prevent the transmission of brucellosis to domestic livestock.

Representative Comment: 10475AE

Issue 7: *Low-Risk Season*

A Comment: If, as APHIS has determined, there are "low-risk" bison, then any time of year other than calving season is a "low-risk" season.

Response: The agencies also have included temporal separation between bison birth materials and cattle to ensure all bacteria have been destroyed. APHIS agrees with permitting bison to roam in certain areas outside the park during certain times of the year but requires that spatial and temporal separation be maintained between bison and cattle to prevent brucellosis transmission from bison to cattle. Other sections of the response to comments (see "Bison: Brucellosis Risk Management," for example), explain recent research on the viability of *B. abortus* in the environment.

Representative Comment: 14634K

Distribution (Carcasses) (BI-7)

Issue 1: ***Sale of Harvested Bison***

A Comment: Selling harvested bison at fair market value and using the proceeds to fund projects within Yellowstone National Park, to purchase wildlife habitat, to repair damages to private property, or to be distributed to Native American tribes indigenous to the area.

Response: The agencies support the donation of bison carcasses to Native American tribes, social service organizations, and charity organizations, as well as the auction of carcasses for the state to defray expenses. The state of Montana has the authority to auction bison carcasses if it chooses. The *Draft Environmental Impact Statement* (p. 58) described the general manner in which bison carcasses would be distributed. Revenue from the sale of bison carcasses by the state of Montana would be used to partially offset costs incurred by the state to implement the bison management plan. If the National Park Service were to sell bison carcasses, under 16 USC 452, all proceeds must be placed in the general treasury.

Representative Comment: 36C, 15366X, 89658B

B Comment: All bison carcasses should be sold at auction to the highest bidder, as long as the auctions do not allow bidders from foreign markets to participate.

Response: There is no federal or state authority to prohibit buyers from foreign markets from participating in any such auction.

Representative Comment: 8831F

C Comment: It is inappropriate to auction bison carcasses; they should be donated to social services, tribal organizations, and low-income families.

Response: The agencies support the donation of carcasses to these groups, as well as the auction of carcasses in order for the state to defray its expenses. Bison carcasses have only been auctioned by the state during the winter of 1996–97. In other years, the state of Montana distributed all bison carcasses to Native American tribes and social service organizations.

Representative Comment: 11409AT, 237D

Issue 2: ***Distribution of Bison Carcasses to Native American Tribes***

A Comment: All bison harvested should be given to Native American tribes, and all costs associated with this should be paid for by the United States government.

Response: The agencies support the donation of bison carcasses to Native American tribes. The general manner in which bison carcasses would be distributed is described in the *Draft Environmental Impact Statement* (p. 58).

Representative Comment: 272A

B Comment: The *Draft Environmental Impact Statement* did not address the process by which the agencies would decide how bison are to be distributed between Native American tribes and social service organizations.

Response: The *Draft Environmental Impact Statement* (p. 58) describes the general manner in which bison carcasses would be distributed. Commenters are correct in noting that the *Draft Environmental Impact Statement* did not establish a process for setting priorities between tribal organizations and other

social service organizations for the distribution of bison carcasses. Under the *Interim Bison Management Plan*, the agencies attempt to equitably share carcasses among all tribes and social service organizations that have expressed interest in receiving bison carcasses. Tribes and social service organizations provide labor to assist with the field processing and transportation of carcasses. They receive the carcasses in return. Tribes and social service organizations are notified each time carcasses are available, and those who are able to respond on short notice participate in that particular field operation.

Representative Comment: 11409AT, 11409AS

C Comment: Native Americans should not be given preference for receiving bison carcasses; average citizens should have equal access to obtain harvested bison.

Response: The agencies believe that it is appropriate that Native Americans receive as many bison carcasses as possible due to their unique cultural relationship with the bison. The *Draft Environmental Impact Statement* (p. 58) describes the general manner in which bison carcasses would be distributed.

Representative Comment: 13129C, 9245A

Issue 3: *Research*

A Comment: All bison harvested should be used to the fullest extent for research on the impact of brucellosis on this population.

Response: Several brucellosis research projects are underway. Many bison that are sent to slaughter facilities have tissue samples collected to determine the effects of brucellosis on the bison and to study the relationship between culture and serology, as well as to gather information on the genetic makeup of the Yellowstone bison. When possible, bison that are shot in the field are also sampled. While each and every animal that is harvested as a result of direct management actions may not be sampled, researchers feel that the number is more than adequate to obtain the information necessary to fulfill research objectives.

Representative Comment: 14819OO

Issue 4: *Natural Processes*

A Comment: A portion of the bison harvested should be left in the field for other animals to consume.

Response: Some of the management actions described in the alternatives would result in some bison that could not be captured and thus would be shot inside the park. In those cases, the carcasses would be retained inside the park for consumption by scavengers, with the exception of a few that might be removed for research, educational, or research purposes. In areas outside park boundaries, carcasses that are fit for human consumption are salvaged; the remainder are removed to alleviate possible human/wildlife conflicts.

Representative Comment: 5855B

Distribution (Live) (BI-8)

Issue 1: ***Distribution of Live Bison to Native American Tribes, Public Lands or Private Entities***

A Comment: Transfer all excess or surplus bison to Native American tribes, the Intertribal Bison Cooperative, or areas of public land outside Yellowstone National Park, including the National Bison Range and other national park units.

Response: Bison would be captured in accordance with the methods described in the alternatives presented in the *Draft Environmental Impact Statement* and the final environmental impact statement modified preferred alternative in an effort to maintain spatial and temporal separation of bison and cattle and to facilitate possible vaccination and shipment to approved quarantine facilities. These bison are not considered to be "surplus" animals. Because of the presence of the *B. abortus* bacteria in this population, bison that are captured and are to be removed must be either sent to quarantine, slaughter, or to approved research projects. The agencies support the distribution of live bison that have completed an approved quarantine protocol to Native American tribes, areas of public land, national park units, wildlife refuges, and to approved research programs.

Representative Comment: 11A, 117C, 6412C, 5507C, 9375I

B Comment: Only test-negative bison should be distributed to Native American tribes and areas of suitable public land.

Response: Because of the presence of the *B. abortus* bacteria in this population, bison that are captured and are to be removed must be either sent to quarantine, slaughter, or to approved research projects. Only bison that have completed an approved quarantine protocol and are certified as brucellosis-free would be available for distribution to Native American tribes, areas of public land, national park units, or wildlife refuges.

Representative Comment: 125G

C Comment: Bison should be shipped live to requesting Native American tribes once all available public land is proven to be unable to support additional bison.

Response: Because of the presence of the *B. abortus* bacteria in this population, bison that are captured and are to be removed must be either sent to quarantine, slaughter, or to approved research projects. The agencies support the distribution of bison that have completed an approved quarantine protocol to Native American tribes, areas of public land, national park units, or wildlife refuges.

Representative Comment: 1676F

D Comment: Bison that complete the entire quarantine procedure should be shipped to requesting Native American tribes or other organizations.

Response: This is the intent of the agencies. As stated in the *Draft Environmental Impact Statement* (p. 109), one purpose of a quarantine facility is to provide a source of live, disease-free bison for tribal governments, requesting organizations, or to establish populations on other public lands.

Representative Comment: 2044B

E Comment: Yellowstone National Park bison should be used to repopulate areas of public land, Native American reservations within a 200-hundred mile radius of Yellowstone National Park, and in Canada. Remove and transfer live bison to any Native American tribes only if the tribes paid all expenses

associated with the transfer and had a suitable management and land base to support the number of bison transferred. This same privilege should be granted to any person who satisfied the above requirements.

Response: The criteria for the distribution of bison will be presented in the NEPA analysis for the establishment and location of a quarantine facility, although as noted above, distribution at least to Native American tribes is considered appropriate by the agencies.

Representative Comment: 3860C, 13357A, 14309G

F Comment: Bison should be removed in "family units" and transferred to tribal or public lands.

Response: As noted above, bison removed from the park must be sent to slaughter, approved research projects, or quarantine. It is possible that family groups may enter quarantine together. However, bison of different age and sex classes take differing amounts of time to complete the protocol (see volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison," table 1 for additional information on the amount of time to complete quarantine). It may not be possible therefore to transfer whole matriarchal groups out of quarantine together.

Representative Comment: 4490G

G Comment: Excess bison should be given to zoos worldwide.

Response: Bison that have completed an approved quarantine protocol may be available for distribution to zoos; however, at this time, it is the desire of the agencies that priority for distribution of these bison be given to Native American tribes and areas of public land. As noted above, final decisions on how bison would be distributed upon completion of quarantine are expected in a subsequent NEPA document focusing on quarantine (also see "Bison: Quarantine" in this volume for more information).

Representative Comment: 154C

H Comment: A waiver of tribal sovereignty allowing state and federal rules and regulations regarding disease management should be signed by the receiving tribe prior to transferring any live bison to Native American reservations.

Response: The agencies assume the commenter is concerned with the distribution of any live bison that clear quarantine. The federal agencies would not support conditioning such distribution on a tribe waiving any tribal sovereignty. If, however, the commenter is addressing conditions for a quarantine facility on tribal lands, those issues will be addressed in the NEPA documents on that process.

Representative Comment: 13461B

I Comment: Bison certified as disease-free need to remain in the public trust and not allowed to be privatized. Bison not transferred to tribal governments must be transferred to state game and fish departments or other federal land or wildlife management agencies.

Response: As stated in the *Draft Environmental Impact Statement* (p. 109), one purpose of a quarantine facility is to provide a source of live, disease-free bison for tribal governments and requesting organizations, or to establish populations on other public lands. The criteria for the distribution of bison will be presented in the NEPA analysis for the establishment and location of a quarantine facility.

Representative Comment: 14819MM

J Comment: Bison should be transferred to the facility at Fort Belknap for holding, testing and relocation.

Response: As noted above, seronegative bison cannot be released without first completing quarantine to ensure they are truly free of brucellosis . Fort Belknap may be considered as a location for a quarantine facility in a future NEPA process, if quarantine is part of the alternative selected for implementation by the agencies.

Representative Comment: 15240C

Issue 2: *Selling Live Bison*

A Comment: Excess bison that are certified brucellosis free should be sold at public auction or through a program similar to the Bureau of Land Management's adopt-a-horse program. Sell excess bison bulls and older individuals and use the proceeds for improvements to Yellowstone National Park buildings, roads, etc. Others completely oppose the sale of bison.

Response: As noted above, only bison that have completed an approved quarantine protocol and are certified as brucellosis free would be available for distribution. As stated in the *Draft Environmental Impact Statement* (p. 109), one purpose of a quarantine facility is to provide a source of live, disease-free bison for tribal governments and requesting organizations, or to establish populations on other public lands. The criteria for the distribution of bison will be presented in the NEPA analysis for establishment and location of a quarantine facility.

Representative Comment: 231C, 5697B, 3059F, 8384F

Issue 3: *Relocating Live Bison*

A Comment: Bison testing positive for brucellosis should be relocated to the interior of Yellowstone National Park as an alternative to sending them to slaughter.

Response: Transport of bison from the capture facilities to the interior of the park was attempted in the northern part of the park in the winter of 1996–97. It was not successful. The conditions that had precipitated the movement in the first place were still occurring, and the animals rapidly returned to lower elevation areas where they were subsequently recaptured. While movement of a small number of individual animals may be technically possible, the movement of a significant number of bison as a routine operational program would be very expensive and is not likely to succeed. Further, it is dangerous for both the bison and the people conducting the operation, particularly if over-snow transport is attempted.

Representative Comment: 14397Q

B Comment: No live bison should be relocated from the Greater Yellowstone Area until proper quarantine facilities and testing protocols are in place.

Response: It is the intention of the agencies that no live bison be relocated from the Greater Yellowstone Area, unless for use in an approved research project, until proper quarantine facilities and protocols are in place.

Representative Comment: 9243D

C Comment: Bison wandering beyond park boundaries should be relocated only when threatening human safety or private property.

Response: The process and conditions under which bison would be removed from private property outside the park, but within SMAs, is described in volume 1, "The Alternatives: Actions Common to All Alternatives — Private Land." Threats to human safety or property are legitimate reasons property owners

may request bison to be removed from their property. Montana may also remove bison it believes pose a disease threat. Otherwise, bison would be hazed back into the park in spring in most alternatives.

Representative Comment: 10438G and 1233F

D Comment: Bison should not be relocated but rather given the freedom to roam the Great Plains.

Response: The agencies considered but rejected alternatives that contained no lethal control and would have allowed the bison population to increase and expand its range without restriction (see DEIS, p. 112). This alternative was rejected by the agencies for several reasons, primary among them that the chance for contact between infectious bison and cattle would dramatically increase if bison were not monitored or managed in any way. Also, since bison would eventually occupy a much larger area where brucellosis has not been a concern for many years, vaccination and testing would likely not be as rigorous and an infection could go undetected. In other words, this alternative would violate several of the objectives of taking action, including #1, 2, 3, 4, 5, and 6, and would be unable to fulfill the half of the purpose statement which reads "address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana."

Representative Comment: 16458C

E Comment: The alternatives in the *Draft Environmental Impact Statement* should include the option of returning to Yellowstone National Park bison that pass quarantine protocols and are certified brucellosis free.

Response: Transporting bison that have completed an approved quarantine protocol back into Yellowstone National Park would expose those bison to the presence of brucellosis and the possibility of reinfection. Also, since most of these bison would have been in a quarantine facility for at least 1.5 years (see volume 1, table 1), they would no longer be considered "wild," and so could not be returned to the Yellowstone population under present park policies.

Representative Comment: 5638B

F Comment: Seronegative bison should be released into the park rather than sent to quarantine as long as the herd would remain within population objectives.

Response: If the "wild and free-ranging" nature of bison has not been unduly compromised, seronegative bison may be held for short periods of time at the Stephens Creek capture facility under certain conditions to meet population or other agency objectives in nearly all alternatives, including the modified preferred alternative. These bison would be released into the park in the spring.

Representative Comment: 5638B

G Comment: The state of Montana has not allowed the transport of live bison to tribal or federal lands due to concerns over disease transmission yet has allowed the transport of live bison over state and federal highways to slaughter facilities up to 160 miles from Yellowstone National Park. The risk of transporting live bison to slaughter, quarantine facilities, or anywhere else should be evaluated as it relates to all alternatives.

Response: Current regulations contain provisions for the transportation of live bison in sealed shipments to either a slaughter facility or to an approved quarantine facility. It is true that there is some very small risk of accidental release of these bison during transport to slaughter. This risk is considered acceptable by Montana and APHIS, however. The risk of transport to quarantine is likely to be substantially lower than the very low risk of transporting bison to slaughter, as bison transported to quarantine would be those testing seronegative. Also, since a facility would be unable to hold very large quantities of live animals (for cost and logistic reasons), fewer shipments to quarantine than to slaughter are likely. A discussion of

factors to consider in locating and transporting bison to quarantine will be part of a separate NEPA analysis tiered to this environmental impact statement if the selected alternative includes quarantine.

Representative Comment: 15363Y

Effects on Free-Ranging Status and Distribution (BI-9)

Issue 1: ***Allow Bison to Freely Roam on Public Lands***

A Comment: Many individuals commented that they wanted bison to roam freely on public lands in and around Yellowstone National Park or they simply wanted bison to roam unconfined.

Response: For purposes of this management plan, "The interagency team has defined a wild, free-ranging population of bison as one that is not routinely handled and can move without restrictions within specific geographic areas." Except for alternative 5, all alternatives provide for some bison to use limited areas outside Yellowstone National Park. Please also see "Bison: Special Management Areas" in this volume.

Representative Comment: Forms 6A, 19C, 21B, 56C, 73E, 102B, 216A, 967C, 6A, 3909B, 4988A

B Comment: Bison should freely roam on public lands for 10 years until a peer-reviewed carrying-capacity can be determined for bison in the Greater Yellowstone ecosystem. Until a carrying capacity is determined, no population control should occur.

Response: In developing the purpose of and need for providing for a wild, free-ranging bison population and addressing the risk of brucellosis transmission to livestock, the agencies recognized that bison could use some public lands under specific conditions. All alternatives, except for alternative 5, provide for some bison use of public lands. The agencies presented alternatives that balanced that use of public lands with the objectives of addressing bison distribution, defining areas beyond which bison would not be tolerated, and protecting livestock from the risk of brucellosis (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," objectives 1, 2, and 5). A similar alternative that contemplated allowing bison to exist with no restriction on distribution (such as the Greater Yellowstone Area) was also considered but rejected because several objectives for the purpose of the plan would not be met (see volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Issues Considered but Not Evaluated Further" and in this volume, "Bison: Special Management Areas — Proposed Boundaries"). Existing carrying capacity models developed for Yellowstone National Park indicated the bison population would fluctuate between 1,700 and 3,500 animals in response to environmental conditions such as severe winters and forage production. In any SMAs or any other areas where bison might be permitted outside the park boundary, bison would be managed to meet the objectives set forth in the environmental impact statement, including limiting the bison population size (see "Bison: Population" in this volume).

Representative Comment: Forms 9 F and 9 B, 3812B

C Comment: Tribes feel bison should be free on private and public lands.

Response: Except for alternative 5, all alternatives contemplate some tolerance for some classes of bison outside Yellowstone National Park on public lands and potentially some private lands within SMAs. For the purposes of this management plan, SMAs were defined as areas "contiguous to the park where some or all bison may be tolerated for part or all of the year, as specified in the selected alternative, without increasing the risk of brucellosis transmission to domestic livestock. " (See volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area") SMAs also address objective 2, "Clearly define a boundary line beyond which bison will not be tolerated," and Montana would be able to move or remove bison approaching or moving beyond any SMA border. Within a SMA, some landowners may or may not want bison on their private property and under Montana law, the Montana Department of Livestock can remove bison on private land pursuant to landowner request and permission. If the Department of Livestock cannot respond to a landowner request to remove bison, the landowner may shoot the bison (see volume 1, "The Alternatives: Actions Common to All Alternatives — Private Land").

Representative Comment: Form 36C

D Comment: The *Draft Environmental Impact Statement* provides no assurances that buffalo will be allowed to range on public lands outside Yellowstone National Park.

Response: In developing the need for action in the environmental impact statement, the agencies recognized that, "Bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that, "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (see volume 1, "Purpose of and Need for Action: Introduction"). The stated purpose is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in the final plan, to use some lands outside the Yellowstone National Park boundary. In addition, the agencies have developed various management alternatives to fulfill the purpose of the plan, including conditions for allowing bison use on public lands. Alternative 5 is the only alternative that does not provide for some bison use of public lands outside Yellowstone National Park. All other alternatives provide for a wide range of bison use of public lands outside the park, and they meet, to varying degrees, the need, purpose, and objectives of a long-term bison management plan. Alternative 1 describes the smallest area and conditions for bison use of public lands, and alternative 2 describes the largest area and different conditions for bison use of public lands.

Representative Comment: Form 39C, 8190C, 122B

E Comment: The *Draft Environmental Impact Statement* ignores the science that buffalo cannot transmit brucellosis to cattle and grants management authority to the Montana Board of Livestock, and this will prevent buffalo from having the freedom to roam outside the park.

Response: Transmission of brucellosis has occurred under confined, experimental conditions between bison and cattle. Although scientists debate whether it has occurred under natural conditions, it is a biological possibility and the agencies are managing to prevent such transmission from occurring while at the same time ensuring a wild and free-ranging population. Definitions of these terms, as well as a discussion of the purpose of taking action, the need the plan is trying to resolve, and the objectives and constraints imposed on the agencies through their policies and mandates are laid out in volume 1, "Purpose of and Need for Action: Objectives and Constraints." Of note, several alternatives do allow bison the freedom to roam outside the park.

Representative Comment: Form 99A

F Comment: Alternative 2 is preferred because it provides for a wild, free-ranging bison population in Yellowstone National Park and adjacent public lands.

Response: All alternatives, except for alternative 5, provide for bison use of lands beyond Yellowstone National Park and maintain a wild, free-ranging bison population, although they do so to varying degrees. The extent of lands outside the park available to bison is largest in alternative 2.

Representative Comment: 1816C

G Comment: One plan to revitalize the plains areas is to revert the land to grasses and let the bison roam on them. Another comment was to restore free-roaming populations throughout the continent.

Response: These comments are beyond the scope of a bison management plan for Montana and Yellowstone National Park and was considered and determined to be unreasonable (see volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Issues Considered but Not Evaluated Further"). Some alternatives, however, do provide for quarantine of bison (alternatives 3, 4, and 7), with the potential of transferring them to tribal lands or other appropriate public lands upon completion of the quarantine protocol.

Representative Comment: 8190C

H Comment: One respondent believed in a strong ecosystem and a balance in nature and, for that reason, suggested bison should be allowed to exist and roam with control. Another respondent believed bison needed to live within the constraints of man.

Response: In developing the need for action, the agencies recognized that, "Bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that, "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (see volume 1, "Purpose of and Need for Action: Introduction"). The stated purpose is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission." In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in a final bison management plan, to use some lands outside the Yellowstone National Park boundary. Alternative 5 is the only alternative that does not provide for some bison use of public lands outside Yellowstone National Park. In addition, the agencies have developed various management alternatives to fulfill the purpose of the plan, including conditions for allowing bison use on public lands. In these alternatives, various levels of control are contemplated, e.g., hazing bison, capture and removal, or shooting in the field. The modified preferred alternative has specific zones and management actions in each for bison nearing the park boundary, occupying land outside the park near the boundary, and for those attempting to migrate further north or west to the reaches of the management zones.

Representative Comment: 3484A

I Comment: The "Citizens' Plan" or "Plan B" will preserve the last free-roaming buffalo.

Response: While some people may believe that only the "Citizens' Plan" or "Plan B" will preserve free-roaming bison, elements of these plans are similar to other alternatives presented in the *Draft Environmental Impact Statement* and are not exclusive in providing for a wild, free-ranging bison population. For additional information see "Alternatives: Plan B" and "Citizens' Plan" in this volume.

Representative Comment: 21B

Issue 2: *Bison Migration Routes*

A Comment: A free-ranging bison population should be able to migrate outside Yellowstone National Park to search for food at lower elevations outside the park during winter.

Response: Except for alternative 5, all alternatives allow for bison to use some lands outside Yellowstone National Park during the winter (also see responses in "Bison: Special Management Areas").

Representative Comment: 8027aA, 918E, Form 110A

B Comment: More lands need to be acquired, or grazing leases phased out, and safe migration routes need to be planned to allow bison to roam freely to areas that can support bison during winter.

Response: Alternatives 2, 3, and 7 propose the acquisition of additional lands primarily for the winter range of bison. The modified preferred alternative includes provisions for the use of recently acquired lands north of the park's Reese Creek boundary by bison when an existing cattle lease expires. None of the alternatives specifically identify migration corridors as important to bison movement to winter range but focus on important winter range adjacent to Yellowstone National Park. The Eagle Creek/Bear Creek area provides for an area where any bison may travel and freely range on public lands. For additional information on modifying public grazing allotments, see "Livestock Operations: Change Cattle Operations, Public Grazing Allotments" in this volume.

Representative Comment: 7555F

C Comment: Because natural migration patterns of bison have been drastically reduced, park boundaries should be extended and feeding stations should be provided inside Yellowstone National Park.

Response: Expanding Yellowstone National Park boundaries would require congressional legislation. As stated in volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action"), "Yellowstone National Park has no plans for expansion of the park boundary." The agencies considered and eliminated feeding as an alternative because of its low probability of success, probability of increased disease transmission, and other undesirable conditions (see this volume, "Alternatives: Alternatives/Issues Eliminated from Further Consideration," issue 1 (Feeding Bison) and volume 1, "The Alternatives: Alternatives Considered but Rejected").

Representative Comment: 238A

D Comment: Bison should be able to roam freely and safely with buffer zones beyond park boundaries so the bison are not inadvertently slaughtered.

Response: All 8 alternatives except alternative 5 fully analyzed in the final environmental impact statement include areas outside the park where bison are tolerated for all or part of the year. The modified preferred alternative includes the concept of buffer zones, with increasingly stringent management of bison as they migrate further from the park.

Representative Comment: 4077C

Issue 3: *Quarantine Facilities*

A Comment: The proposed quarantine facility will block the roaming corridor for bison.

Response: Alternatives 3, 4, 7, and the modified preferred alternative propose the use of a quarantine facility as a management alternative for seronegative bison. No decision has been made regarding construction or use of a quarantine facility, and no location has been determined for a quarantine facility in any of the alternatives. If quarantine was part of the final plan and record of decision, additional planning, NEPA compliance, and review may be required regarding design, location, and other issues, such as a quarantine facility blocking or interfering with wildlife roaming corridors.

Representative Comment: 326D

B Comment: Move bison to western Indian reservations where they can roam freely as they did for hundreds of years.

Response: As noted in the sections of this volume titled, "Bison: Distribution (Live)" and "Bison: Quarantine," bison from this herd cannot be transferred until they have been declared truly free of brucellosis — that is, they have completed an APHIS-prescribed quarantine procedure. At this time, they may be able to roam freely on reservations or on public lands if quarantine is included in the alternative the agencies select for implementation. Specifics, including location, design, and the means used to determine which requesting agencies, tribes, or organizations receive bison would be decided in a future NEPA planning process if federal agency decisions, land, or money were involved.

Representative Comment: 229A

C Comment: The migration patterns of bison in quarantine facilities will be disrupted, the bison will not be free-ranging, and they will be like zoo animals.

Response: Bison in any type of quarantine facility would not be free-ranging. Bison completing quarantine would not be returned to Yellowstone but rather offered to Native American tribes or other appropriate public lands. Bison moved to these areas would not need to know or use migratory patterns

that might be necessary for survival in Yellowstone. See "Bison: Quarantine Operations" for more information.

Representative Comment: 429C, 15671B

Issue 4: *Historic Range*

A Comment: Bison should be allowed their traditional habitat and winter range. Allowing bison access to winter range serves the public's interest.

Response: Except for alternative 5, all alternatives allow for bison to use some lands outside Yellowstone National Park during winter. For additional information, see other responses in this section and the "Bison: Special Management Areas."

Representative Comment: 395D, 7572B, 255C

Issue 5: *Bison Movement Related to Road Grooming*

A Comment: Stop trail grooming to reduce the number and rate of bison leaving the park. Another commenter claimed the road system has expedited the bison exodus from the park, particularly during winter. Alternatively, another commenter claimed closing groomed roads will result in bison movement out of the park via natural corridor routes.

Response: In an effort to better understand the relationship of bison movements and the use of the winter groomed road system, managers have instituted studies that address this issue. While groomed roads may have contributed to the redistribution of bison within park boundaries (Meagher 1997), it appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward park boundaries may occur on such routes. Monitoring of bison movements in the Hayden Valley and Mammoth to Gibbon Falls sections of the park has found that less than 12% of bison movements occurred on the groomed road surface (Kurz 1998, 1999b). However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas, and westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement/distribution patterns (refer to volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 15175A, 11518B, 7262B and C

Issue 6: *Miscellaneous Comments*

A Comment: Hazing bison should be an option in every alternative. Develop a systematic program of nonlethal means to return bison that wander out of Yellowstone National Park.

Response: All alternatives provide for some level of hazing or other nonlethal means of moving bison back into appropriate lands where they are allowed. As stated in volume 1, "The Alternatives: Actions Common to All Alternatives — Bison Distribution Limits," "When bison move beyond the designated management boundary, agency personnel may haze bison back into the management area. Hazing may employ a variety of methods including noise, rubber bullets, cracker shells, dogs, and baiting. Hazing may take place on foot, on horseback, in vehicles, or by air. If bison cannot be hazed back into the management area, they may be shot."

Representative Comment: 170B, 2933C

B Comment: The environmental impact statement will inhibit ever seeing free-ranging bison in the Bighorn Basin.

Response: The Bighorn Basin is over 100 miles outside the management area considered for this bison management plan; therefore, it is beyond the scope of this management plan. If the commenter is referring to tribal lands in Bighorn Basin, then alternatives 3, 4, 7, and the modified preferred alternative do provide the opportunity for tribes to obtain seronegative bison that have completed quarantine and may be an opportunity to have free-ranging Yellowstone bison in the Bighorn Basin.

Representative Comment: 6927D

Humane Treatment (BI-10)

Issue 1: ***Support for Specific Alternatives***

A Comment: Alternative 2 is the most humane alternative in the *Draft Environmental Impact Statement*.

Response: Alternative 2 includes the largest area outside of Yellowstone National Park of all alternatives in which bison would be able to range with minimal agency management. Movements of bison would be monitored and some boundaries maintained through hazing in the SMAs. Lethal control would only be used in cases where human health was in immediate danger, on private property at the request of the landowner, or outside of SMA borders. Bison would not be captured or slaughtered by agencies, and all existing capture facilities would be dismantled. The closure of some groomed roads or leaving roads ungroomed within the park would also be used as a means to isolate herds from boundary areas, minimizing the need to maintain boundaries through hazing. When a safe and effective vaccine is developed, it would be administered to bison in the park through remote means, precluding the need for capture and handling in the vaccination process.

Representative Comment: 187A

B Comment: Alternative 7 calls for maintaining humane treatment of bison.

Response: As stated in volume 1, "The Alternatives: Actions Common to All Alternatives — Humane Treatment of Bison," the agencies have included measures to ensure the humane treatment of bison during capture, test, and slaughter operations. Appendix F includes a description of those measures and actions applied to all alternatives, including alternative 7.

Representative Comment: 252A

C Comment: The "Citizens' Plan" alternative is a more humane strategy for managing bison.

Response: The final environmental impact statement addresses several comments regarding the "Citizens' Plan" (see "Alternatives: Citizens' Plan" in this volume). The "Citizens' Plan" contains many features similar to those analyzed in the environmental impact statement. Differences that pertain to the humane treatment of bison include trapping or tranquilizing bison that cannot be hazed back into the park and placing them in quarantine. Use of a pasture-type quarantine with a protocol similar to that for cattle, which would not require bison to spend several years in quarantine, would be instituted. Lethal control would be the last option.

Representative Comment: 2665B

D Comment: The "Plan B" alternative is a more humane strategy for managing bison.

Response: "Plan B" relies on the removal of cattle from lands outside of the park in lieu of the capture, test, and slaughter of bison. No capture or quarantine facilities are included in this plan. "Plan B" also allows for wild, free-roaming bison in the Greater Yellowstone Area with no management controls outside the park. However, allowing bison to roam freely with no boundary lines beyond which bison would not be tolerated and no management controls outside the park would not meet the stated objectives for a bison management plan. (See "Alternatives: Plan B" in this volume.)

Representative Comment: 2742B

Issue 2: ***Opposition to Specific Alternatives***

A Comment: Alternative 5 is an inhumane alternative.

Response: Alternative 5 does rely on more intensive capture, test, and slaughter operations, which some may feel are more inhumane.

Representative Comment: 943B

Issue 3: ***Humane Treatment in Current Management Practices***

A Comment: The current practice of allowing some bison to starve during the winter is inhumane, and the environmental impact statement should contain a description of the fate of bison that die of cold and starvation (winterkill), or of predation. Commenters suggested feeding bison during such times to prevent starvation.

Response: As stated in NPS 1988 (pp. 21-23), natural processes will be relied on to control populations of native species to the greatest extent possible. Examples of natural processes include natural selection and predation. Bison that die of cold and starvation (winterkill), or of predation, become available as carrion to a wide variety of predators and scavengers such as ravens, coyotes, wolves, and bears. Most professional wildlife managers discourage the artificial feeding of wildlife as a management tool for several reasons, including an increase in the likelihood of transmission of disease and parasites among animals within and between species. In addition, attempts to use artificial feeding to direct Yellowstone area bison in the late 1970s and early 1980s failed because bison were not attracted to the feed (see "Alternatives: Alternatives/Issues Eliminated from Further Consideration" and the report, "Severe Winter Road Closure and Bison Feeding Contingency Plan Report" [NPS, unpubl. data]).

Representative Comment: 227B, 11433I, 14834E

B Comment: All of the alternatives contain actions (hunting, capture and slaughter, shipping, agency shooting, and quarantine) that are intrusive and inhumane. The capture and shipping of bison is inherently cruel, the use of electric prods in capture operations is inhumane, and the tagging and marking of captured bison is inhumane. The agencies are not capable of humanely treating bison, and humane handling methods should be a priority in brucellosis eradication efforts. Agencies should modify the management plan to require humane treatment of bison.

Response: The National Park Service has expressed interest in all agencies working jointly to continue to review and improve procedures and to develop a set of humane protocols for handling bison. According to *National Park Service-77: Natural Resources Management Guideline* (chapter 2, pp. 38–39), the National Park Service may control diseases in native animal populations if the disease presents a threat to livestock, humans, or local agricultural concerns. Live trapping, physical restraint, darting and immobilizing, collaring, marking, or tagging may be conducted as part of an approved management program or research study. The facility at Stephens Creek has been modified to make any changes that would improve operations and the handling of bison in order to prevent injury to staff as well as bison. The facility is inspected annually to determine if it is in good operational order and to make needed repairs. Each section has water available for bison, as well as food and water for bison that will remain in the facility for extended periods of time. It has been noted that bison become less agitated, receive fewer injuries, and experience less stress when handled in a quiet, calm manner. Electric prods are used sparingly. Holding pens and chutes are paneled to minimize injuries due to attempts to escape and from catching horns. Other measures which can reduce injuries to bison include the use of plastic hose over horns and keeping facilities from becoming overcrowded. During transport, bison experience less stress and remain calmer in trailers with paneling that limits the animals' vision. Fewer injuries to bison result when they are sorted by sex and body size in the facility and during transport. Currently, the animal quarantine and related laws do not provide the secretary of agriculture with the authority to ensure the humane treatment of bison. However, while there is no policy for the humane treatment of cattle in quarantine, under 49 USC 80502, an animal cannot be confined in a vehicle or vessel for more than 28 consecutive hours without unloading the animal for feed, water, and rest. Additionally, under 7 USC 1901 et. seq., the slaughtering of livestock and the handling of livestock in connection with slaughter is required to be carried out using humane methods. Finally, although under the federal Animal Welfare Act, bison in a research facility must be

maintained in a humane manner, there is no provision for the humane treatment of wild bison being transported or otherwise.

Representative Comment: 2319A, 256A, 15214B, 14835E, 14714KK, 8626I, 15366, 10656C, 13472B, 15150aA

C Comment: Although current management practices may be technically considered humane, they are not ethical.

Response: How observers process the management of bison depends largely on their social values. The environmental impact statement analyzes these impacts in volume 1, "Environmental Consequences: Impacts on Socioeconomics — Social Values."

Representative Comment: 9025C

D Comment: It is inhumane to groom roads, thereby providing bison with a "highway" out of the park, and then kill the bison when they use the roads to exit the park.

Response: While groomed roads may have contributed to the redistribution of bison within park boundaries (Meagher 1997), it appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward park boundaries may occur on such routes. Monitoring of bison movements in the Hayden Valley and Mammoth to Gibbon Falls sections of the park has found that less than 12% of bison movements occurred on the groomed road surface (Kurz 1998, 1999b). However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas, and westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (refer to volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 9092K

E Comment: Hazing of bison in late winter and spring may have an adverse impact on females in the late stages of pregnancy.

Response: In many situations hazing may be detrimental to bison and bison management. Repeated hazing in early winter may produce weight loss and poor body condition which decreases the animal's ability to endure the remaining winter (volume 1, appendix F). Bison on the northern boundary of the park are hazed on horseback and on foot. Bison on the western boundary of the park are also hazed with the use of helicopters and snowmobiles. Hazing is carried out in as patient and gentle a manner as possible; bison are not stampeded. No known pregnant cows have aborted during capture operations. Only one case of abortion after hazing has been recorded. While it is not known what effects the different hazing techniques have on bison, hazing is not likely to have adverse impacts on females in the late stages of pregnancy (M. Philo, APHIS pers. comm.). Because untested bison would be allowed on some public lands outside the park, step 3 of the modified preferred alternative eliminates the need for the agencies to conduct repeated hazing operations throughout the early winter months. Bison, up to a tolerance level of 100 at each boundary area, are allowed to occupy public lands outside the park. These bison would not be subject to agency hazing operations until 45 days prior to the return of cattle to these areas.

Representative Comment: 15545U

Issue 4: ***Humane Treatment in Proposed Management Strategies***

A Comment: The hunting of bison is inhumane because bison are habituated to people and because bison are hungry and seeking food. The ease and rapidity with which bison were nearly eliminated 100 years ago is evidence that hunting of bison does not meet the standards of "fair chase." Hunting bison in a "fair chase" situation is a more humane way to cull bison than other management options.

Response: The agencies are committed to maintaining a "fair chase" hunt to the extent that this is possible. Montana's Basic Hunting Laws, which would likely apply to a bison hunt if it were to be authorized, closely follow the widely accepted rules of fair chase hunting as established by the Boone and Crockett Club. Montana laws stipulate that hunters may not lure animals into licks or bait stations. Hunters are also prohibited from shooting from motorized vehicles or from a road or right-of-way. Where bison hunts currently take place, such as in the Henry Mountains in southern Utah and the House Rock Valley area of northern Arizona, it has been noted that, while bison were initially easy to locate and kill, they became increasingly wary of humans in a relatively short time period. Orientations for bison hunts include discussions on weapon caliber and bullet placement. While hunting is an effective tool for the management of wildlife populations, it does not distinguish between healthy and diseased animals. The modified preferred alternative does not include hunting as a management component. See "Bison: Hunting" in this volume for further information.

Representative Comment: 1395A, 14855H

B Comment: The proposed actions may reduce the bison to "zoo-like conditions," by killing them if they cross a political boundary.

Response: Even the most restrictive of the alternatives still allows the bison herd to occupy more than 2 million acres in Yellowstone National Park. We do not believe this is akin to "zoo-like conditions." The requirement to "clearly define a boundary line beyond which bison will not be tolerated" is one of the nine objectives agreed to by all participating agencies as an appropriate one to maintain control over the threat of transmitting brucellosis from the bison herd to susceptible cattle.

Representative Comment: 8186B

C Comment: A more humane quarantine system must be established similar to the system used for cattle, and/or one that allows a pasture-type system rather than a feedlot operation.

Response: The bison quarantine protocol was designed to account for the long incubation period that may occur in bison due to the fact that they reach sexual maturity later than domestic cattle. Bison may spend from several months to several years in a quarantine facility, depending on sex and age classifications (see volume 1, table 1). "Appendix B: Quarantine Protocol for Bison" in the *Draft Environmental Impact Statement* describes the quarantine protocol for bison. Bison will be treated as humanely as possible while in quarantine facilities, although because cattle in quarantine remain on the owner's land, no specific standards for cattle are available to mimic. The type of facility would be decided in a future NEPA planning process, and a pasture-type system is likely to be one of the alternatives analyzed.

Representative Comment: 10791G, 14850C

D Comment: It is more ethical for bison slated for removal to be shot by hunters than to be captured and trucked to a slaughterhouse.

Response: Volume 1, "The Alternatives: Actions Common to All Alternatives — Humane Treatment" discusses the option of agency shooting in the field, rather than capturing and trucking bison to slaughter. This process may be relatively more humane, as would covering open grid fences or horns to prevent injury to bison during loading and transport. Hunting may also be more humane if the hunt conforms to the precepts of a "fair chase." (see "Bison: Hunting" in this volume for more information.)

Representative Comment: 994A

E Comment: A humane, nonintrusive (i.e., not involving capture) method of delivering vaccine to bison must be developed before vaccination is used.

Response: In all alternatives the agencies are proposing the use of a vaccine when it is safe for captured bison, and when it is safe and effective for free-ranging bison. Before a remote safe and effective vaccine can be used, the delivery system must also be tested safe and effective. Factors to consider include the tolerance of bison for multiple doses, whether marking of bison is required to avoid multiple doses, the effective range of delivery (how close personnel delivering the vaccine need to be to the bison), bison's tendency to avoid personnel, seasonal timing for delivery based on desired age for vaccination, feasibility of vaccinating at particular times of the year, and others. Development and testing of a safe and effective delivery mechanism should be completed for implementation during winter 2002/2003.

Representative Comment: 16329G

Issue 5: ***Additional Analysis, Corrections, Information***

A Comment: The agencies have failed to evaluate the humaneness of hunting/shooting, slaughter, quarantine, and vaccination. The environmental impact statement must contain an analysis of management techniques that would not adversely impact bison.

Response: As stated in volume 1, "The Alternatives: Actions Common to All Alternatives — Humane Treatment of Bison," the agencies have included measures to ensure the humane treatment of bison during capture, test, and slaughter operations. The humane treatment of bison is also discussed in appendix F.

Representative Comment: 15671D, 14714KK

B Comment: The alternatives fail to include any comprehensive monitoring program to assess the level of cruelty associated with the capture and shipment of bison.

Response: A comprehensive monitoring program is not in place at this time, but could be considered in the future. The federal Animal Welfare Act would require bison in a research facility to be maintained in a humane manner, but has no provision for the humane treatment of wild bison being transported or otherwise. Under 49 USC 80502, an animal cannot be confined to a vehicle or vessel for more than 28 consecutive hours without unloading the animal for feed, water, and rest. No federal animal welfare acts or laws specifically address wildlife. In addition, the state of Montana does not have any laws that address the humane treatment of wildlife. "Appendix F: Summary of Bison Management Techniques" in volume 1 summarizes techniques used during capture and transport, as well as other management techniques.

Representative Comment: 14714KK

C Comment: The *Draft Environmental Impact Statement* fails to meaningfully analyze the cruelty associated with capture, test, and slaughter operations activities included in most of the alternatives. The *Draft Environmental Impact Statement* failed to recognize that the wild nature of bison makes capture more cruel than for domesticated livestock.

Response: The capture and handling techniques applied to bison are described in appendix F of volume 1. During the severe winter of 1996–97, a minimum estimate of 634 individual "animal handling events" occurred at the Stephens Creek facility. This number is based on the sum of the number of animals that died, plus those that were shipped or released from the facility, assuming each animal was only handled once. The actual number of "handling events" would be higher than 634, as some animals were handled more than once. Of the 634 animals handled at the facility, 8 were put down. Based on the minimum estimate of 634 handling events, the maximum estimated percentage of bison mortality related to handling

at the capture facility was 1.3% (8/634). Since the actual number of "handling events" was greater than 634, the actual mortality rate was lower than 1.3% by an undetermined amount. There were six additional bison mortalities in the northern area that involved NPS personnel, for a total of 14 mortalities on the northern side of the park (M.B. Murray, unpubl. data). Bison are treated as humanely as possible during capture and handling.

Representative Comment: 14714KK

Issue 6: ***Animal Welfare, Animal Rights, and Related Concerns***

A Comment: Bison are not treated with the same respect and humaneness as other wildlife species. It is inappropriate to treat wild bison like domestic cattle.

Response: In Montana, Yellowstone bison have the unusual status of being managed by the Montana Department of Livestock because of their potential for brucellosis transmission to cattle. The Montana Legislature assigned management to the Department of Livestock during the 1995 legislative session. There are no guidelines in place in the state of Montana for the humane treatment of bison or cattle (R. Tierney, pers. comm.). The protocols for bison and cattle differ in that cattle in quarantine remain on the owners' land and are not taken to a quarantine facility, as would be the case for bison.

Representative Comment: 17708G, 8625A

B Comment: Bison have a right to live without pain and suffering; bison should be nurtured and treated with respect because they are a symbol of American heritage. Bison are referred to in the *Draft Environmental Impact Statement*, "as if they were inanimate objects." The environmental impact statement should recognize the stress that bison experience as a result of human activity and management.

Response: In the *Draft Environmental Impact Statement* "The Alternatives: Actions Common to All Alternatives — Bison Capture" and "Humane Treatment of Bison," management techniques developed to reduce stress and injuries to bison are discussed. Human impacts on bison as a result of winter recreation, such as habitat modification, pollution, and disturbance, can have a number of effects on bison, including behavioral change or death. Behavioral change may consist of altered behavior, altered vigor, or altered productivity. Alteration of wildlife movements or displacement from normal wintering areas can result in higher energetic costs for winter-stressed wildlife, potentially decreasing production of young (Greater Yellowstone Winter Wildlife Working Group, 1998). While bison do experience stress related to human activity and management, they are treated as humanely as possible during management activities.

Representative Comment: 13191C, 10009C, 500E, 8110A, 3345B

C Comment: Lethal management techniques should not be used because they are inhumane, both in method and in rationale. Only nonlethal methods should be used to relocate bison, and those should be used only when human safety or property is threatened.

Response: Only nonlethal methods are used to relocate bison. Most alternatives, including the modified preferred alternative, rely on hazing, rather than shooting, to move bison from private property, or to move them back into the park in the spring. It is only bison not amenable to hazing that are shot.

Representative Comment: 619A, 1034A, 11424F

Issue 7: ***General Concerns***

A Comment: Bison should not be killed because it promotes human cruelty toward animals and human violence in general.

Response: There is no data to suggest that bison management promotes increased human cruelty to animals or human violence.

Representative Comment: 3509B

B Comment: The mission of the National Park Service is to protect wildlife in parks, which includes treating them humanely.

Response: It is true that the mission of the National Park Service is to protect wildlife. In addition, NPS 1988, p. 38) states that parks may control diseases in native animal populations if the disease presents a threat to livestock, humans, or local agricultural concerns, and if the disease is an exotic organism. The management of bison to reduce the risk of transmission outside of the park is conducted in as humane a manner as possible.

Representative Comment: 3975C

C Comment: The killing of bison is "unethical and immoral" because there has been no demonstrated transmission of brucellosis from bison to cattle.

Response: Transmission under experimental conditions has been demonstrated between bison and cattle. The National Academy of Sciences report (NAS 1998) noted that the spread of brucellosis is highly associated with abortion and the birthing process, neither of which can occur until a female is sexually mature. APHIS, the federal agency responsible for conferring or revoking class-free status, recently stated that male bison and calf and yearling female bison pose a low risk of transmission of brucellosis to cattle (see "Bison: Brucellosis in the Yellowstone Bison Herd" in this volume). Even though the risk of transmission of brucellosis from bison to cattle is small, the purpose of taking action is to protect the class-free status of the state of Montana, as well as to maintain a wild, free-ranging bison population.

Representative Comment: 6690A

D Comment: Killing bison and shipping them "for food to other foreign people" is inhumane.

Response: See Issue 6, questions A, B, and C for responses to humane treatment. See p. 58 in the *Draft Environmental Impact Statement* for an explanation of the distribution of bison carcasses.

Representative Comment: 7434C

E Comment: The wishes of a few should not override the wishes of the American public for the humane treatment of bison.

Response: Although the "wishes of the American public" are an important consideration, the agencies are bound by the purpose, need, objectives, and constraints identified in the environmental impact statement. These include the protection of Montana cattle in the impact area from brucellosis transmission by Yellowstone bison; actions some members of the public found distasteful (such as capture, test and slaughter operations, or shooting) are ones the agencies believe can be most effective in meeting these objectives. Bison are treated humanely to the extent possible, as described in volume 1, "The Alternatives: Actions Common to All Alternatives — Humane Treatment of Bison," regardless of the alternative. Also, some alternatives minimize management of bison (such as phase 2 of alternatives 2 and 3), including lethal management, and maximize management of cattle.

Representative Comment: 10742C

F Comment: No mention is made of the impact of stress on bison within "Impacts on Bison Population" in the DEIS summary (p. 11). The only item addressed is how the various alternatives will affect the size of the population. In all other "impacts" summaries, several items are addressed. Why is it that the species

that would be most greatly affected by the alternatives in this *Draft Environmental Impact Statement* is only granted consideration with respect to effects on population size and nothing else (i.e., stress, family structure, psychological impacts of management on the bison herd and individual bison).

Response: See issue 6, "Bison: Population" in this volume.

Representative Comment: 1006

Hunting (BI-11)

Issue 1: **Oppose Hunting of Bison**

A Comment: Hunting of bison for any reason should be opposed, and it should be illegal to shoot or harm bison in any way. Some expressed opposition to the idea of hunting a national emblem such as bison.

Response: The agencies acknowledge that some people are opposed to the public hunting of bison. As stated in the *Draft Environmental Impact Statement* (p. 36), it was not possible for the agencies to consider an alternative that employed no lethal controls while still meeting the objective to "clearly define a boundary line beyond which the bison will not be tolerated." Hunting was considered in some alternatives as a means for controlling bison population size and distribution, largely because hunting is a proven and accepted tool for managing wildlife populations. The Montana Legislature in 1989 removed the authorization to hunt bison in Montana, however, and it would require action on the part of the legislature to reinstate a bison hunt. The modified preferred alternative does not include hunting as a management component.

Representative Comment: 70B, 265D, 288C, 13298B

B Comment: Hunting of bison as trophies should be opposed, and hunting bison would be a "waste of bison."

Response: It is not possible to completely describe how a bison hunting season would be administered, because a hunt would first need to be approved by the Montana Legislature, seasons and permit quotas would be recommended by the Montana Fish, Wildlife and Parks Commission, and those recommendations would require review and approval by the Montana Fish, Wildlife and Parks Commission. It is likely, however, that both males and females would be hunted in varying numbers. The Utah Department of Wildlife Resources found that it was necessary to hunt both sexes in order to maintain a varied age structure and a reasonable sex ratio, and also to achieve effective population control (Hodson and Karpowitz 1997). If these objectives were incorporated into regulations for a bison hunt in Montana, it is anticipated that a variety of sexes and ages would be hunted, making it less likely that a bison hunt would be perceived as a "trophy" hunt opportunity. Montana statutes prohibit the waste of game that is otherwise suitable for food (87-3-102, M.C.A.).

Representative Comment: 2C, 707C

C Comment: Bison should be protected from hunting because of their historic near-annihilation and their current low numbers.

Response: We assume from the wording used that the commenters believe that bison should not be killed at all. However, two of the objectives stated in the *Draft Environmental Impact Statement* (p. 29), are to "address population size and distribution; have specific commitments relating to size of bison herd," and to "clearly define a boundary line beyond which bison will not be tolerated." In order to accomplish these objectives, some lethal controls must be included in all alternatives considered in the environmental impact statement. Hunting was therefore considered in some alternatives as a means of controlling bison population size and distribution. Hunting is a proven and accepted management tool that has been used on other, much smaller bison populations successfully (Hodson and Karpowitz 1997; R. Lee, Arizona Game and Fish, pers. comm.; DuBois and Rogers 1999), and on other species that also suffered severe reductions earlier in the century (e.g., elk and pronghorn). The agencies are committed to maintaining the bison population within the established objectives (1,700–3,500 for most alternatives), and to not allow the bison population to fall below the number considered to be necessary to maintain genetic and demographic integrity of the population (see volume 1, "The Alternatives: Actions Common to All Alternatives — Bison Population Numbers."

Representative Comment: 2C, 424B

D Comment: Hunting bison does not address the goal of preventing cattle from being infected with *B. abortus*, and does not focus on the goal of eradicating brucellosis.

Response: Although one of the objectives of this management plan is to "commit to the eventual elimination of brucellosis in bison and other wildlife" (volume 1, "Purpose of and Need for Action — Objectives and Constraints"), the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of this management plan." All alternatives emphasize the maintenance of spatial and temporal separation between bison and cattle to reduce the risk of transmission of *B. abortus* bacteria. If authorized, public hunting, as described in alternatives 3, 4, and 7, would be one of several methods used to control bison numbers and distribution as part of maintaining this separation.

Representative Comment: 274B, 1063H, 9144C

E Comment: It is inappropriate to place bison management in the hands of sport hunters. By including hunting, the environmental impact statement places emphasis on the economic gains of hunting licenses, and hunting contradicts the plan's stated purpose of maintaining a free-ranging population of bison.

Response: If hunting was approved by the Montana Legislature, the Montana Department of Fish, Wildlife and Parks (the agency responsible for monitoring and management of wildlife in Montana) would make recommendations to the Montana Department of Fish, Wildlife and Parks as to season length and format, permit quotas, and special regulations, as is currently done for other hunted wildlife species. The Montana Department of Fish, Wildlife and Parks would make annual recommendations for permit quotas in response to several conditions, including bison population size (see volume 1, "The Alternatives: Alternative 3: Management with Emphasis on Public Hunting — Public Hunting"). If the Montana Legislature authorized a bison hunting season, the distribution of license revenues would be in accordance with the revised statutes. Currently, revenue from the sale of other hunting licenses is the source of state funds for the Montana Department of Fish, Wildlife and Parks and supports various fish and wildlife management activities, including population monitoring and law enforcement. The agencies have defined "wild and free-ranging" as "not routinely handled by humans," and able to "move without restrictions within specific geographic areas" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action"). Of the bison populations on public lands in the U.S., only the Yellowstone bison population, the Henry Mountains population, the House Rock population, and four small populations in Alaska (the Delta, Farewell, Chitina, and Copper River Delta herds) exist in a non-fenced range or without roundups, culling, or other manipulative management intervention. All of these except the Yellowstone population are managed only through annual hunts. Therefore these populations fit the agreed-upon definition of "wild and free-ranging."

Representative Comment: 9144C, 274B, 1063H

F Comment: It is inappropriate to capitalize on the fact that bison migrate out of the park by hunting them once they leave. Care must be taken not to eliminate the migratory segment of the population through the hunting of animals that leave the park.

Response: Two of the objectives stated in the environmental impact statement (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action") are to "address population size and distribution; have specific commitments relating to size of bison herd," and to "clearly define a boundary line beyond which bison will not be tolerated." In order to accomplish these objectives, some lethal controls must be included in all alternatives considered in the environmental impact statement. Hunting was therefore considered in some alternatives as a means of controlling bison population size and distribution. Hunting is a proven and accepted management tool that has been used on other bison populations (Hodson and Karpowitz 1997; R. Lee, Arizona Game and Fish, pers. com; DuBois and Rogers 1999), and on other migratory wildlife populations successfully without affecting overall migratory behavior. Populations of elk and mule deer in northern Yellowstone, for example, summer largely within the park boundary and both historically and currently migrate to winter range at lower elevations outside the park boundary. Although these species are protected from hunting inside the

park, hunting outside the boundary has been employed by the Montana Department of Fish, Wildlife and Parks as an effective tool for population and habitat management. In these cases, the use of hunting as a management tool is possible because of the migratory habits of these species. Captures and removals of bison in mid-century during the period of intensive management of all park ungulates did not appear to impact the ability of the bison population, once released from artificial control in 1968, to increase in number and expand into previously unoccupied habitat.

Representative Comment: 15420RR, 14202K

Issue 2: *Support Hunting*

A Comment: Hunting privileges are one of our American rights. During public scoping much of the public expressed support for hunting of bison if it is done ethically.

Response: Hunting was considered in three alternatives (alternatives 3, 4, and 7) as a means for controlling bison population size and distribution, largely because hunting is a proven and accepted tool for managing wildlife populations. The environmental impact statement (see volume 1, "The Alternatives: Alternative 3: Management with Emphasis on Public Hunting — Public Hunting") states that any approved hunt would be conducted as a "fair chase" hunt to the extent possible. Hunters would likely be required to attend an orientation to ensure accurate marksmanship, knowledge of and respect for bison, and emphasis on utilizing all parts of the carcass.

Representative Comment: 15420SS

B Comment: Humans have historically been important predators on bison, and therefore allowing hunting of bison is "natural." This perspective has been left out of the *Draft Environmental Impact Statement*.

Response: Although evidence exists that human predation on bison in some areas may have occurred at a level significantly influencing the population dynamics and behavior of bison, the degree to which this occurred, the timing and distribution of such influences by humans, and the specific influence this had on bison populations cannot be determined from the available historical and archeological records (Fisher and Roll 1997). Prior to the late 1800s some Native Americans existed in a significant and complex ecological relationship with bison that included predation by hunting (Fisher and Roll 1997). The total bison population at that time, however, numbered anywhere from 30 million to 60 million. The relationship between humans and bison has been drastically and permanently altered through the mass extermination of bison across the Great Plains, restoration of relatively small populations of bison in Yellowstone and other limited areas, political boundaries, and extensive human development on formerly wild lands. Hunting of bison or any other species, therefore, must be considered entirely in the current ecological, political, and social context. Hunting was considered in three alternatives (alternatives 3, 4, and 7) as a means for controlling bison population size and distribution, largely because hunting is a proven and accepted tool for managing wildlife populations.

Representative Comment: 9023B, 10555A

C Comment: Hunting should be used to control bison population size, and the environmental impact statement should include more emphasis on hunting as a tool to remove "surplus" bison on public lands.

Response: Any bison removed in a hunt would be hunted as part of efforts to maintain spatial and temporal separation of bison and cattle, and would not be considered "surplus" animals. Alternative 3 emphasizes "hunting of bison to regulate bison population numbers and distribution outside the park." The other alternatives that include hunting (alternatives 4 and 7) emphasize it less, and rely on management actions other than hunting to control bison population size and distribution. The inclusion of three alternatives that use hunting to varying degrees as a management tool ensures that a variety of levels, and therefore impacts, of hunting have been considered and analyzed.

Representative Comment: 924AG, 940E, 15240RR, 9268F

Issue 3: ***Limit the Use and Extent of Hunting***

A Comment: Hunting should be allowed only if the other management programs outlined in the *Draft Environmental Impact Statement* have been carried out. Hunting should be used only if thorough demographic and genetic monitoring of the entire population was undertaken.

Response: Each alternative is a complete "package" of management actions, designed to be carried out as a complete management program. Alternatives that include hunting also include other management actions that must be carried out to comply with the objectives of the management plan (see volume 1, "The Alternative: Introduction"). Currently, the National Park Service conducts aerial bison counts approximately once a month. The Park Service is also developing methods to conduct annual composition counts to determine the proportion of cows, calves, and bulls in the population. Research is underway to evaluate techniques by which to accurately estimate the bison population size (see, volume 1, appendix D for a list of current and proposed research projects). The National Park Service is committed to conducting regular population counts using current techniques and, when available, updated counting methodology. The agencies have agreed to review the results of any current or future research and adjust management actions if appropriate (see volume 1, "The Alternatives: Actions Common to All Alternatives — Research Efforts"). If hunting took place, the Montana Department of Fish, Wildlife and Parks would make recommendations for permit quotas in response to several conditions, including bison population size (see, volume 1, "The Alternatives: Alternative 3: Management with Emphasis on Public Hunting — Public Hunting"). Research proposed to begin in 2000 will include the analysis of the genetic structure of the Yellowstone herd and compare it with that of other NPS herds, determine whether non-random selection of genetic groups may be occurring in management actions, and evaluate the predicted effects of various population sizes and various management strategies (NPS, 1999c). The agencies are committed to maintaining the bison population within the established objectives (1,700–3,500 for most alternatives) and not allowing the bison population to fall below the number considered to be necessary to maintain genetic and demographic integrity of the population (see, volume 1, "The Alternatives: Actions Common to All Alternatives — Bison Population Numbers").

Representative Comment: 194C

B Comment: Hunting should be allowed only after the total population once again numbers in the millions.

Response: The agencies considered but rejected alternatives that contained no lethal control and would have allowed the bison population to increase without restriction (see DEIS, p. 112). This course of events would not meet the objectives of the management plan, two of which are to "clearly define a boundary line beyond which bison will not be tolerated," and to "protect livestock from the risk of brucellosis" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints"). The agencies felt that allowing the bison population to expand in size and therefore distribution without restriction would increase the risk of transmission of brucellosis to cattle and therefore jeopardize Montana's class-free status. Allowing the bison population to increase to the point of numbering in the millions would require changes in land use practices over a vast area outside of the area considered in the management plan, and is therefore outside the scope of the plan.

Representative Comment: 1066I

C Comment: Hunting should be used only to remove bison that would otherwise slaughtered, but should not be conducted on "healthy" bison. It is more ethical for bison slated for removal to be shot by hunters than to be captured and trucked to a slaughterhouse. Some commenters supported hunting, but not with the intent to control herd size.

Response: We assume that by "healthy" the commenter means seronegative bison. In the alternatives that include hunting, the purpose is either to control bison population size and distribution (alternative 3) or to

provide recreational opportunities and to assist with the control of population size and distribution (alternatives 4 and 7). In phase 2 of alternative 3, bison exiting along the west boundary of the park would not be tested; therefore, it would not be possible for hunters to determine which bison had been exposed to brucellosis. In alternatives 4 and 7, in which hunting would occur primarily for recreational opportunity rather than for population control, only seronegative or low-risk bison would be allowed outside the west boundary of the park; therefore, only seronegative bison would be available for hunting. In all three of these alternatives, bison in the Eagle Creek/Bear Creek area would remain untested, and therefore hunters would be unable to determine brucellosis exposure of targeted animals (see also "Bison: Humane Treatment," in this volume).

Representative Comment: 8586B, 10557J, 994A

D Comment: Hunting should not be allowed until a bison-carrying capacity is developed for all suitable habitat in the Greater Yellowstone Area and all cattle ranching on public lands adjacent to Yellowstone National Park and in historic bison habitat is eliminated.

Response: The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana" (DEIS, p. 11). Therefore, the alternatives must address both of these goals. As noted in the *Draft Environmental Impact Statement,* "livestock grazing is a legally authorized activity on many public lands, and these issues are beyond the scope of this environmental impact statement." Some modifications of public grazing allotments are included in alternatives 2 and 3. Currently, several bison ecology studies and related research projects are underway, including a project to synthesize all the available information and develop an ecological carrying capacity for bison in the Greater Yellowstone ecosystem (see volume 1, appendix D). (Refer also to "Bison: Special Management Areas" and "Bison: Land Acquisitions/Easements or Winter Range" in this volume.)

Representative Comment: 15317G

Issue 4: *Ethics of Hunting*

A Comment: Hunting should be ethical. The large size of bison makes them easy to hit but hard to kill, their habituation to humans makes the hunt unsportsmanlike, and it is unethical to hunt bison on winter range when they are in poor condition and seeking forage. Any hunting should be conducted as a "fair chase" hunt. The lack of a fair chase element in a bison hunt will have a negative impact on the image of hunters and hunting. Others commented that "Bison learn quickly to avoid actions such as hazing or hunting," and stated that the environmental impact statement needs to consider this aspect of hunting, and to look at the effect of hunting on other herds.

Response: The agencies are committed to maintaining a "fair chase" hunt to the extent possible. As stated in the environmental impact statement (see the *Draft Environmental Impact Statement,* "The Alternatives: Alternative 3: Management with Emphasis on Public Hunting — Public Hunting," p. 81), it is expected that a bison hunt would "include training or orientation to ensure accurate marksmanship, knowledge of and respect for bison, and emphasizing that all meat, as well as the hide and heads, should be used." Montana's Basic Hunting Laws, which would likely apply to a bison hunt, if authorized, closely follow the widely accepted rules of fair chase hunting as established by the Boone and Crockett Club. Montana laws stipulate that hunters are prohibited from wasting meat, may not shoot from a motorized vehicle or from a road or right-of-way, may not use a motorized vehicle to concentrate, drive, or round up wildlife, may not lure animals for the purposes of hunting into licks, bait stations, traps, or "jacklights," or kill any animal at such places, may not locate animals via aircraft on the same day of the hunt, and may not use two-way radios or other electronic devices to locate or hunt animals. As an example of a successful and widely accepted bison hunt, the Henry Mountains bison population in southern Utah is hunted annually to meet population objectives. According to Hodson and Karpowitz (1997), the annual hunt "really is a 'hunt,' as opposed to being a 'shoot.'" When hunts were first established for this population, bison were apparently relatively easy to find and kill. However, they rapidly became wary of humans during the

hunting season. The number of days per kill has increased measurably in recent years, facilitated by the ruggedness of the terrain and the fact that bison use areas not easily accessible by road. The required orientation session for this hunt includes discussion of weapon caliber and bullet placement, proper field dressing to protect the meat, and the nature and potential difficulty of the hunt. Emphasis is also placed on proper sex/age identification to ensure that appropriate bison are killed and management goals are met. Hunters are entirely on their own after the orientation session (J. Karpowitz, Utah Division of Wildlife Resources, pers. comm.). The Arizona Department of Game and Fish also manages hunts for two separate bison herds in northern and central Arizona. In the smaller, more confined Raymond Ranch area of central Arizona, hunters are accompanied by department personnel who assist hunters in identifying the correct sex and age of bison for the hunter to kill. Department personnel do not assist the hunter in any other way. In the approximately 65,000-acre House Rock Valley area of northern Arizona, hunting occurs in more remote conditions, hunters are unaccompanied, and bison tend to be more difficult to find and are warier of humans. An extensive orientation is also conducted for these hunts, emphasizing proper identification of bison sex and age (Lee 1993, R. Lee, Arizona Game and Fish, pers. comm.). Hunts in both areas are generally well accepted by the public. Researchers working in Yellowstone have noted that bison in their study areas have become increasingly difficult to approach and capture (K. Aune, Montana Department of Fish, Wildlife and Parks, pers. comm.), which suggests that bison may become warier and more difficult to hunt after only a few hunting seasons.

Representative Comment: 14714LL, 10571H, 1395A, 14700Q, 5455G, 15420SS

Issue 5: ***Effects of Hunting***

A Comment: "Too much hunting" could become too commercialized.

Response: If authorized, public hunting as described in alternatives 3, 4, and 7 would be one of several methods used to control bison numbers and distribution in order to protect livestock from the risk of brucellosis. Any alternative that includes hunting also includes other management actions that must be carried out in order to comply with the objectives of the management plan (see volume 1, "The Alternatives: Introduction"). If hunting were to take place, the Montana Department of Fish, Wildlife and Parks would make recommendations for permit quotas in response to several conditions, including bison population size (see DEIS, pp. 81–82). As with all other hunts in Montana, bison hunting would be regulated by the Montana Department of Fish, Wildlife and Parks and the Montana Fish, Wildlife and Parks Commission. The agencies are committed to maintaining the bison population within the established objectives (1,700–3,500 for most alternatives), and to not allowing the bison population to fall below the number considered necessary to maintain genetic and demographic integrity of the population (see DEIS, p. 54).

Representative Comment: 187A

B Comment: The environmental impact statement needs to provide more detail on the short- and long-term effects of hunting, in terms of the removal of healthy animals (e.g., not just taking the old, sick, or weak) and consequent impact on the gene pool, impacts on population trend, potential stress on the herd, etc.

Response: It is not possible to completely describe how the bison season would be administered, because Montana statutes do not currently authorize bison hunting. It is therefore not possible to predict the specific impacts of hunting on individual bison; it is possible to predict the impacts on the bison population only in the most general terms. Hunting is a proven and accepted management tool that has been used on other bison populations (Hodson and Karpowitz 1997; R. Lee, Arizona Game and Fish, pers. comm.), and on other migratory wildlife populations successfully. Hunted populations of bison elsewhere and of elk and mule deer in the northern Yellowstone area do not appear to have adverse impacts on population structure, trend, migration habits, or other behaviors. If the state approved a bison hunt, bison hunting regulations might be developed as special hunting regulations that recognize the unique nature of this species. The Montana Department of Fish, Wildlife and Parks would prepare recommendations regarding season dates, fees, quotas, application process, bag limits, and classification types to be hunted,

etc., and would forward their recommendations to the Fish, Wildlife and Parks Commission for public review and action on the proposal. Recommendations for permit quotas would be made in response to several conditions, including bison population size (see DEIS, pp. 81–82).

Representative Comment: 3668A

C Comment: Hunting would not reduce brucellosis, but might instead weaken the gene pool by removing "desirable seronegative bison" and increasing the density of infectees in the population.

Response: At least one alternative (alternative 3) provides for hunting of bison regardless of serologic status. In phase 2 of alternative 3, bison exiting along the west boundary of the park would not be tested; therefore it would not be possible for hunters to determine which bison had been exposed to brucellosis. In alternatives 4 and 7, in which hunting would occur primarily for recreational opportunity rather than for population control, only seronegative or low-risk bison would be allowed outside the west boundary of the park; therefore, only seronegative bison would be available for hunting. Depending on the level of hunting, this could potentially balance the removal of seropositive bison occurring in test and slaughter operations in that area. In all three of these alternatives, bison in the Eagle Creek/Bear Creek area would remain untested, and therefore hunters would be unable to determine brucellosis exposure of targeted animals. Hunting is therefore likely to remove relatively equal numbers of seropositive and seronegative bison, and to have negligible impact on the density of either type of bison in the population.

Representative Comment: 9144C

D Comment: Hunting in the northern and western SMAs would effectively prevent bison from occupying public or private lands outside Yellowstone National Park.

Response: Please refer to responses to comments under the topic "Bison: Special Management Areas." SMAs are defined as areas adjoining the park, "where some or all bison may be tolerated for part of that year, as specified in the selected alternative" (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Areas"). SMAs could serve as "buffer zones" as described in the National Research Council report (1998), in which management actions can "facilitate the transition between goals of two contrasting land uses," such as national parks or preserves and surrounding agricultural land. Hunting was considered in some alternatives (alternatives 3, 4, and 7) as a means of controlling bison population size and distribution in SMAs, but not as a means to eliminate bison use of those areas. Populations of other migratory ungulates summer largely within the park boundary and migrate to winter range at lower elevations outside the park boundary. Although these species are protected from hunting inside the park, hunting outside the boundary has occurred for decades without preventing ungulates from using those areas. As with other migratory wildlife, it is anticipated that hunting will not prevent bison from moving outside the park boundary and utilizing areas designated as bison winter range.

Representative Comment:

E Comment: Hunting may cause bison to become shy around humans, which would have a negative impact on the ability of tourists and others to view bison in the park.

Response: Although bison hunted in other areas have learned to avoid humans during the hunting season (Hodson and Karpowitz 1997), and certain bison in Yellowstone have learned to be wary of and to avoid researchers (K. Aune, Montana Department of Fish, Wildlife and Parks, pers. comm.), it is unlikely that this would impact the ability of visitors to view bison. The Arizona Department of Game and Fish successfully achieves its management objectives to control bison population size through a regulated hunt and to provide recreational viewing opportunities for the public (Arizona Game and Fish 1995). In most years only a small portion of the Yellowstone bison population migrates beyond the park boundaries, and therefore it is only this portion that would be subject to hunting pressure. A portion of the elk population in northern Yellowstone is hunted outside the Yellowstone National Park boundary from late October

through mid February, but elk are available for viewing year-round. It appears that elk have learned to distinguish between areas where they are not hunted and those where they are, as well as between hunting and non-hunting seasons. In areas and during times when elk are not being hunted, they exhibit relatively minor flight response to human presence.

Representative Comment: 14714LL

Issue 6: *Hunting in Yellowstone National Park*

A Comment: The National Park Service should urge the secretary of the interior to seek legislation to authorize hunting inside Yellowstone National Park. The U.S. Department of Interior should consider allowing a Native American harvest of bison inside Yellowstone National Park, and/or hunting of bison inside Yellowstone National Park using archery or primitive weapons. Hunting should not be allowed within any state or national park or "protected area."

Response: The 1988 *National Park Service Management Policies* (NPS 1988) state that "Hunting, trapping or any other method of harvesting wildlife by the public will be allowed only in parks where it is specifically authorized by federal law"(8:4). Hunting is specifically prohibited in Yellowstone National Park by federal law, as stated in 16 USC 26: "All hunting, or the killing, wounding, or capturing at any time of any bird or wild animal, except dangerous animals, when it is necessary to prevent them from destroying human life or inflicting an injury, is prohibited within the limits of said park." Hunting of bison or any other wildlife is considered inconsistent with other NPS policies that state, "Natural processes will be relied on to control populations of native species to the greatest extent possible" (NPS 1988 4:6). Furthermore, hunting within the park is incompatible with the long-established patterns of visitor use and visitor expectations that include undisturbed wildlife viewing, hiking, and camping. Hunting within the park would raise serious safety issues, given the number of visitors to the park, their patterns of use, and the likely distribution of bison during a hunting season. It would also require additional personnel and consequent equipment and monetary resources to conduct patrols, enforce hunting regulations, and assist hunters. No state parks or other protected areas exist within the area considered by the management plan.

Representative Comment: 2838H, 111B, 5917F, 7319G

Issue 7: *Corrections/Additional Analysis Needed*

A Comment: The environmental impact statement needs a more complete examination of the Henry Mountains bison herd in Utah, which has been hunted under fair-chase rules, and other areas where bison are hunted to document how hunts are operated and the response of bison to hunters.

Response: The text has been changed to include this information. Also, refer to the "Bison: Hunting — Issue 5" (Ethics of Hunting), for a discussion of hunts in Utah and Arizona.

Representative Comment: 15420SS

B Comment: Bison that use the Absaroka management area are not the "Absaroka herd," because they are not separate from the Yellowstone herd (see DEIS, p. 155). The discussion should state that "a reduction season is held on Yellowstone Park bison using the Absaroka management area east of the park." The discussion of bison reduction season in the *Draft Environmental Impact Statement* (p. 156) is not accurate.

Response: These issues have been addressed in the final environmental impact statement.

Representative Comment: 5917G

C Comment: The failure of Montana to introduce/pass a bill to authorize a hunt means that this action will not be implemented.

Response: A decision to implement any alternative that includes public hunting would commit the cooperating agencies to request that the Montana Legislature authorize Montana to establish regulations for the public hunting of bison (see volume 1 "The Alternatives," alternatives 3, 4, and 7). The Montana Departments of Livestock and Fish, and Wildlife and Parks would honor their respective obligations, as defined in the record of decision once it is made. Montana did not introduce bison hunting legislation during the 1999 legislative session because the record of decision had not yet been issued. Also refer to "Objectives and Constraints: Legal and Policy Mandates" in this volume.

Representative Comment: 14819DD

Issue 8: ***Miscellaneous***

A Comment: Hunting is being used as a guise to gain approval for establishing SMAs outside the park boundary.

Response: In developing the purpose of and need for action for the environmental impact statement, the agencies recognized that "Bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (see DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in the final bison management plan, to use some lands outside the Yellowstone National Park boundary. Therefore, SMAs were proposed in five alternatives, only three of which also propose hunting within the SMAs. SMAs could serve as "buffer zones" as described in the National Research Council report (1998), in which management actions can "facilitate the transition between goals of two contrasting land uses," such as national parks or preserves and surrounding agricultural land. Hunting was considered in some alternatives (alternatives 3, 4, and 7) as a means of controlling bison population size and distribution in SMAs, in addition to other measures that would ensure the spatial and temporal separation of bison and cattle.

Representative Comment: 9097E

B Comment: It would be irresponsible to allow public hunting of bison that are infected with brucellosis, which could be transmitted to humans.

Response: As noted in the *Draft Environmental Impact Statement* (pp. 296–297), "an additional group of people at moderate risk includes hunters, who would come in contact with tissues during field dressing, and might handle pregnant females or their fetuses. With training, which would be considered mandatory, the risk of transmission of brucellosis to hunters would be minor." During the 1980s, when several hundred bison were killed and dressed by hunters, no cases of human brucellosis (undulant fever) were reported. More than 3,000 bison have been killed and carcasses processed over the past 30 years by agency field personnel, hunters, and slaughterhouse workers exercising varying levels of caution in handling dead animals. No cases of undulant fever have been reported as a result of handling these bison. Of the thousands of hunters who have harvested brucellosis-exposed pregnant female elk in the Greater Yellowstone Area, only two (one in 1986 and one in 1995) have contracted undulant fever believed to have come from handling elk carcasses (NPS et al. 1996).

Representative Comment: 940E

Issue 9: ***Specifics of Regulations, Timing, Duration, Numbers, Administration of Bison Hunt***

A Comment: Allowing hunting will create the expectation of a huntable population outside the park, but the *Draft Environmental Impact Statement* proposes hunts of only token numbers of animals. Therefore hunting should only be allowed after additional effective measures are in place regarding boundary control and other population control methods that will ensure no safety, property or economic risk to Montanans. Specifics must first be developed relative to seasons, locations and conduct of the hunt so that

another media circus is avoided and Montana does not receive negative publicity. More information is needed regarding hunting permits, seasons, and methods.

Response: Each alternative is a "package" of management actions, designed to be carried out as a single program. In phase 2 of alternative 3 public hunting would be one of several methods used to control bison numbers and distribution outside the park boundary. In alternatives 4 and 7 hunting would occur primarily for recreational opportunity rather than for population control. These alternatives also include other measures to ensure spatial and temporal separation of bison and cattle. If the final preferred alternative includes public hunting, the agencies would request the Montana Legislature to revise the statutes that govern the Montana Board of Livestock, the Department of Livestock, the Fish, Wildlife and Parks Commission, and the Department of Fish, Wildlife and Parks. Those revisions would include authority to issue licenses, to promulgate regulations for the public hunting of bison, and to administer public hunting seasons. The Board of Livestock would likely determine if and at what locations bison hunting would be authorized. The Department of Fish, Wildlife and Parks would then prepare recommendations regarding season dates, fees, quotas, application process, bag limits and classification types to be hunted, etc., and would forward their recommendations to the Fish, Wildlife and Parks Commission for public review and action on the proposal. Each licensed hunter would be authorized to hunt bison only during the time period and only in the area designated on her/his license. The hunting license would not provide the assurance that bison would actually occupy the specified area during the designated hunting period. Hunting regulations would be strictly enforced. Hunters would be notified of the health risks and appropriate precautions for handling dead bison. There would also likely be reporting and scientific collection requirements for all hunts.

Representative Comment: 15316J, 237A, 252A, 427D, 593A, 10316C, 36B, 425H, 8807A

B Comment: Rules regarding the use of meat by hunters should be established.

Response: Montana statutes prohibit the waste of game that is otherwise suitable for food (MCA 87-3-102).

Representative Comment: 8851G

C Comment: Hunting should be allowed in all SMAs to provide an effective management tool. Hunting should only be conducted on private lands.

Response: If public hunting was proposed for inclusion in the approved bison management plan, the Board of Livestock would likely determine if and at what locations bison hunting would be authorized. The Department of Fish, Wildlife and Parks would then prepare recommendations regarding season dates, fees, quotas, application process, bag limits and classification types to be hunted, etc., and would forward its recommendations to the Montana Fish, Wildlife and Parks Commission for public review and action on the proposal. Refer also to other comment responses for information regarding areas proposed for hunting. These areas include portions of the western and northern SMAs. As specified by Montana laws, all hunting on private land requires the permission of the landowner.

Representative Comment: 4433J, 748G

D Comment: What is the range of those eligible to hunt bison: hunting by "citizens of the mountain states," hunting by Montanans only, hunting by local residents only, or recreational hunting by anyone who wishes to hunt?

Response: If public hunting was included in the approved bison management plan and the Montana Legislature authorized a bison hunting season, bison licenses would be issued according to provisions in the revised statutes. Current law authorizes the Montana Fish, Wildlife and Parks Commission to establish hunting seasons and bag limits (87-1-304, M.C.A.) and restrictions on hunting licenses (87-2-506, M.C.A.). Current law also specifies that when the number of valid resident applications for big game

licenses exceeds the number of licenses in a restricted class, the number of licenses that may be issued to nonresidents may not exceed 10% of the total issued.

Representative Comment: 1682B, 14865E, 15267D, 8745I

E Comment: Hunting should be done only by Native Americans (thereby reducing the "controversial use of hunting as a management tool").

Response: If public hunting was included in the approved bison management plan and if the Montana Legislature authorized a bison hunting season, bison licenses would be issued according to provisions in the revised statutes. Native American hunting and treaty rights issues are complex and are beyond the scope of this environmental impact statement. Depending on the outcome of separate processes to consider treaty rights issues, however, federally recognized tribes wishing to exercise hunting rights under established treaties could potentially be a part of the implementation of bison hunting should an alternative be chosen that includes hunting.

Representative Comment: 2C, 14980BB

F Comment: Cattle operators affected by the removal of cattle should be given hunting permits that they could then sell for trophy hunts.

Response: Current law does not authorize Montana to issue hunting licenses for subsequent sale by private individuals.

Representative Comment: 13449C

Issue 10: ***Administration and Oversight of Hunting***

A Comment: The National Park Service should have input into establishing hunting guidelines. The National Park Service should not be involved at all in establishing or administering sports hunting of bison.

Response: If public hunting was included in the bison management plan and if the Montana Legislature authorized a bison hunting season, bison licenses would be issued according to provisions in the revised statute. When developing proposals for bison hunting regulations, the responsible state agency would consult with cooperating agencies.

Representative Comment: 10001K, 1358G

B Comment: Native American tribes should play a central role in organizing hunts.

Response: Native American hunting and treaty rights issues are complex and are beyond the scope of this environmental impact statement. Depending on the outcome of separate processes to consider treaty rights issues, however, federally recognized tribes wishing to exercise hunting rights under established treaties could potentially be a part of the implementation of bison hunting, should an alternative be chosen that includes hunting.

Representative Comment: 13052C

Issue 11: ***Hunting Revenue***

A Comment: The agencies should turn the presence of bison in Montana into a positive economic benefit to the state.

Response: It is unlikely that license revenues would be sufficient to offset the agency costs to administer a bison hunting season. Alternatives that include hunting would, however, be expected to provide a benefit to the local economy through expenditures made by hunters during their stay in the hunting area (refer to volume 1, "Environmental Consequences: Impacts on Socioeconomics," impacts of alternatives 3, 4, and 7.

Representative Comment: 476F

B Comment: Hunting on private land would provide landowners an economic benefit from the presence of bison.

Response: The agencies consider public hunting to be one of several methods that might be employed to control bison numbers and distribution. It is possible that individual landowners might charge fees for bison hunting access.

Representative Comment: 1302G

C Comment: The agencies can't charge to hunt bison since they belong to the people.

Response: If implemented, bison hunting would occur pursuant to legislation adopted by the Montana Legislature. The legislature has the authority to establish fees for all hunting and fishing licenses in Montana, and fees are currently charged for all such licenses issued. Revenue from the sale of these licenses is the source of state funds for the Montana Department of Fish, Wildlife and Parks and supports various fish and wildlife management activities, including population monitoring and law enforcement.

Representative Comment: 1536C

D Comment: Use license sales and large trophy fees to promote animal welfare, purchase additional land within bison winter range, provide for restoration of bison, and vaccinate and test bison for brucellosis.

Response: The majority of revenues from hunting and fishing licenses in Montana are currently appropriated to the Montana Department of Fish, Wildlife and Parks for the purpose of wildlife conservation, which includes population monitoring, law enforcement, and other activities. The Montana Legislature also has dedicated revenues derived from the sale of specific licenses for specific conservation purposes. Dedication of bison license fees to animal welfare or land acquisition for bison winter range would require specific provisions in the legislation that authorized the bison hunting season. It should be noted, however, that the amount of the anticipated revenue from the sale of bison licenses may not be sufficient to accomplish these purposes (refer to DEIS, "Environmental Consequences: Regional Economy," table 45, p. 258).

Representative Comment: 6743E, 7831G, 8745I

Population (BI-12)

Issue 1: ***Support/Opposition for Establishing a Population Maximum***

A Comment: In the absence of large numbers of predators or a significant element of human-caused mortality, the bison population would increase until disease or habitat degradation caused a population decline. Some commenters expressed opposition to this possible chain of events.

Response: Boyce (1990) (see volume 1, "Environmental Consequences: Impacts to Bison Population") used a range of conditions based on actual data on summer forage production and winter severity, both of which appear to influence bison population dynamics, to model the Yellowstone bison population over time. He found that the combination of occasional severe winters and drought summers, along with a relatively low level of predation by wolves, tended to keep the modeled population between about 1,700 and 3,500 bison. The National Research Council of the National Academy of Sciences examined bison population dynamics using count data collected over the past 97 years, when there was little or no predation on bison (NAS 1998). When numbers are corrected for removals, the bison population appeared to increase at a constant rate. The population was reduced through management removals and winterkills during the winters of 1988–89, 1991–92, 1994–95, and 1996–97. Available data indicate that the bison population is likely to increase again until reduced by another harsh winter (NAS 1998). Bison removed during management actions were in good-to-excellent body condition, indicating that even at a population of more than 3,500 there is little or no evidence of inadequate forage quantity or quality (NAS 1998). These data suggest that bison are more likely to be limited by winter mortality than by impacts to habitat, which have not been observed (Singer et al. 1998). Because natural mortality rates, rates of bison migration from Yellowstone, and rates of exchange between wintering herds are all related to winter severity (Angliss, unpubl. data), natural mortality of bison was characterized as winterkill because deaths during other portions of the year constitute a negligible proportion of total mortality. Disease does not appear to have an effect on Yellowstone bison population trends, as evidenced by the constant growth rate occurring even at higher population density. Ongoing research is expected to provide specific data on birth rate related to disease status, but this information may not be available in the final environmental impact statement for three to five more years. The modified preferred alternative in the final environmental impact statement prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Greater Yellowstone Area ecosystem.

Representative Comment: 2838C

B Comment: A carrying capacity should be established for maintaining bison year-round inside the park, without allowing for bison to move beyond the Yellowstone National Park boundary. Bison numbers must be controlled due to the number of humans inhabiting the area. Allowing the bison population to grow and expand will only increase the magnitude and area of the "problem."

Response: In developing the purpose and need for action in the environmental impact statement, the agencies recognized that "Bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (see volume 1, "Purpose of and Need for Action"). In agreeing on these statements, the agencies have recognized that it is appropriate for bison under specific conditions to use some lands outside the Yellowstone National Park boundary. The agencies also agreed that one of the objectives of the plan is to "Address bison population size and distribution" and "have specific commitments relating to size of the bison herd" (volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action"). Although a specific ecological carrying capacity for bison in Yellowstone National Park has not yet been established, a population model developed by Boyce (1990) indicated that given natural variations in weather and forage production, the Yellowstone bison population should fluctuate between 1,700 and 3,500 animals. The stochastic bison population model that was used to analyze the effects of alternatives did not explicitly account for the role of forage availability or quality because natural mortality rates, rates of bison migration from Yellowstone National Park, and rates of exchange between wintering herds are all related

primarily to winter severity. The policies of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, unregulated by human removals within the park to the maximum extent possible (NPS 1988). Currently, a review of available science related to the management of ungulates and their effect on rangeland within Yellowstone National Park is being conducted by the National Academy of Sciences. A final consensus report of the National Academy of Sciences review is expected by October 2000 and will be presented to the U.S. Department of the Interior and Congress. Objective 2 in this environmental impact statement (see volume 1, "Purpose of and Need for Action: Objectives and Constraints,") states that each alternative must "Clearly define a boundary line beyond which bison will not be tolerated." In any SMAs or other areas where bison might be permitted outside the park boundary, bison would be managed to meet the environmental impact statement objectives, including limiting population size and protecting livestock from the risk of brucellosis through separation in both time and space. Alternative 5 would preclude bison movement outside the park boundary, and alternative 6 would severely restrict bison use of areas outside the park. See "Bison: Land Acquisitions/Easements or Winter Range" in this volume for more information regarding bison use of areas outside the park (issues 1A and 3E). The modified preferred alternative prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Greater Yellowstone ecosystem.

Representative Comment: 9364MM

C Comment: No population objectives should be established for the Yellowstone herd, and the herd size should be dictated by natural factors, including predators and harsh winter weather. Attempts to establish and maintain a population objective fail to take into consideration that fluctuating environmental conditions may mean that it is not possible to determine a static "carrying capacity." The impacts of wolves on the bison population have not been fully experienced or documented, and that setting population objectives should be postponed until such impacts are better understood. Numbers of natural predators should be increased to control bison population size.

Response: The agencies agreed that one of the plan objectives is to "address bison population size and distribution" and to "have specific commitments relating to size of the bison herd" (see DEIS, p. 29). See issue 1B above regarding the bison population range predicted by modelling; also refer to the *Draft Environmental Impact Statement* (p. 196). All alternatives except alternative 7 allow the bison population to be maintained within this range largely through natural processes, although the population may be influenced periodically by management actions. Boyce and Gaillard (1992) predicted that predation by wolves is likely to decrease the average bison population by less than 15%. This level of predation was included in the predictions of bison population range used in this environmental impact statement. Boyce (1990) also predicted that wolves might reduce the variation in bison population size by approximately 10%. Currently, predation by wolves appears to be a minor source of mortality for bison (Smith et al. 1999). In the Yellowstone National Park northern range, elk are much more available and represent easier prey for wolves than bison, and in the Madison-Firehole area elk are present, though less abundant than bison during certain times in the winter and may represent easier prey (Smith et al. 1999). It is possible that wolves may eventually have some impact on numbers of bison in Pelican Valley, where elk are not present during the winter and in localized areas of the Madison-Firehole area. Although the wolf population has been increasing, predation by wolves is not expected to influence the total bison population size (D. Smith, National Park Service, pers. comm.). Yellowstone Center for Resources staff continue to monitor wolf predation on bison (Smith et al. 1999) and will periodically assess impacts on the bison population. Should wolves begin to have an impact on bison, the National Park Service will review bison population goals and management appropriately.

Representative Comment: 1563D

D Comment: Setting a maximum allowable population size for bison will set a precedent by which in the future maximum population sizes and consequently population control, will be established for Yellowstone elk and other wildlife species.

Response: The agencies are committed to managing bison as other wildlife are managed, recognizing that, unlike for other wildlife, a major component of bison management is related to the management of the risk of disease transmission to cattle. As with other wildlife, tolerance for bison on private lands and potential private property damage are also considerations. Additionally, the agencies have agreed that one of the objectives of the plan is to "clearly define a boundary line beyond which bison will not be tolerated" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints"). None of the alternatives calls for culling bison inside the Yellowstone National Park boundary specifically for the purpose of controlling population size. In all alternatives except alternative 2, however, test and slaughter activities occurring inside the park will have the effect of contributing to or carrying out population control. It is anticipated that in the future bison may be managed in a similar fashion as other migratory wildlife species such as elk, whether or not a hunting season is reestablished for bison in Montana. No population sizes are set for elk, for example, within the park boundary, but the Montana Department of Fish, Wildlife and Parks sets habitat, and in some cases population objectives, for elk outside the park boundary. Elk are managed to meet these objectives through a regulated annual hunting season. The National Park Service cooperates with the Montana Department of Fish, Wildlife and Parks in gathering elk population data, including counts and herd composition estimates that are used in setting hunting quotas and regulations.

Representative Comment: 918D

E Comment: Manipulating the bison population to achieve a population cap, as in alternative 7, would mean that the Yellowstone bison population will no longer be the "last wild, free roaming bison herd in the world."

Response: The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" (see DEIS, p. 11). Management actions considered in the alternatives are intended to accomplish both of these goals. The policies of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, unregulated by human removals to the maximum extent possible (NPS 1988). A population size of approximately 3,000 was identified (NAS 1998) as a "rule of thumb," above which the frequency and size of bison movements to areas outside the park would increase. The agencies have defined "wild and free-ranging" as "not routinely handled by humans," and able to "move without restrictions within specific geographic areas" (see DEIS, p. 28). The modified preferred alternative in this final environmental impact statement promotes spatial separation of bison and cattle through a series of increasingly stringent management zones outside the park, whereby some untested bison that are not captured or handled may temporarily use traditional winter ranges as annual winter weather patterns dictates. Although Yellowstone bison are also the only bison population in the U.S. that is directly descended from bison occupying that area prior to the exterminations of the late 1800s and early 1900s, there are currently other wild, free-roaming bison herds both in the U.S. and Canada. The Henry Mountains herd in Utah, the House Rock herd in Arizona, and four small herds in Alaska (the Delta, Farewell, Chitina, and Copper River Delta herds) exist in a nonfenced range or without roundups, culling, or other manipulative management intervention. All of these except the Yellowstone population are managed only through annual hunts. Bison in Wood Buffalo National Park and the Mackenzie Bison Sanctuary, in the Northwest Territories, in Canada, also are descended all or in part from indigenous bison, and are also wild and free-ranging herds.

Representative Comment: 777A

Issue 2: ***Method for Choosing Population Range***

A Comment: The *Draft Environmental Impact Statement* "fails to provide a scientific basis for the establishment of limits on the bison population size" on lands both inside and outside the park; there was no legitimate basis for setting the population size to 1,700–2,500 bison in alternative 7. This range is inadequate to accommodate natural fluctuations in the population, and a scientific evaluation of carrying capacity must be conducted.

Response: Boyce (1990) (see issues 1A and 1B above) used a range of conditions based on actual data of summer forage production and winter severity, both of which appear to influence bison population dynamics, to model the Yellowstone bison population over time. The limit for the bison population of 2,500 animals in alternative 7 was near the midpoint of the long-term population range identified by Boyce's model. A population size of approximately 3,000 was identified as a "rule of thumb" (NAS 1998) above which the frequency and size of bison movements to areas outside the park would increase. Below that level the probability of movement and the size of the movement is much lower. The modified preferred alternative prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Yellowstone ecosystem. Under the modified preferred alternative the bison population for the deterministic model was estimated to increase from initial starting conditions to approximately 3,250, where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of the Modified Preferred Alternative").

Currently, several bison ecology studies and related research projects are underway, including a project that will synthesize all the available information and develop an ecological carrying capacity for bison in the Greater Yellowstone ecosystem (see volume 1, appendix D for a listing of current and proposed research projects). This work is expected to be completed late in 2001 or early in 2002. The National Academy of Sciences is currently reviewing all available science related to the management of ungulates and the ecological effects of ungulates on the rangeland of Yellowstone National Park in order to address questions related to current ungulate population dynamics on the northern range, the extent that density-dependent and density-independent factors determine densities and fluctuations in ungulate populations, and the consequences of continuing the current natural regulation practices. A final consensus report is expected by October 2000 and will be provided to the Department of the Interior and Congress.

Representative Comment: 9364X

B Comment: Range management practices should be employed to develop population objectives for bison in Yellowstone National Park, as well as guidelines for establishing those objectives. Park bison should be managed according to common ranching and animal husbandry practices. The park should not be overgrazed, the established population range should prevent "over-use" of winter range and reduce the magnitude of migration out of the park. (See "Bison: Vegetation/Vegetative Communities" in this volume for more information.)

Response: As noted in the *Draft Environment Impact Statement* (p. 31), NPS Management Policies have a goal of allowing natural processes to regulate the fluctuation in populations of native species to the greatest extent possible (NPS 1988). Using domestic grazing management, ranching, or animal husbandry practices, all of which generally require intensive manipulation of animal herds, manipulation of vegetation, and artificial feeding during winter (which would greatly increase disease transmission risk), would be in conflict with this policy. Most population objectives set by range managers for domestic livestock grazing are based on "economic carrying capacity" (Caughley 1979), which manages for underuse of forage to maximize production of, and hence economic gain from, livestock grazing on that forage. It is a "contrived equilibrium, held in place only by human intervention" (MacNab 1985). When livestock production for economic purposes, or wildlife production for hunting offtake are not goals, however, as in a national park, managers may instead allow populations to fluctuate around "environmental" or ecological carrying capacity (MacNab 1985). This reflects the dynamics by which ungulate populations both impact and respond to the dynamics of the plants on which they feed. As noted in the *Draft Environmental Impact Statement* (pp. 21–22), recent studies conducted in Yellowstone National Park indicate that grassland habitats within the park exhibit high productivity and species diversity and do not appear to be adversely affected by the ungulate population size.

A recent study of the effects of the NPS natural regulation policy evaluated the park's northern winter range according to several established criteria for range overuse (Singer et al. 1998). The study found that according to four measures of range health, the northern range has not suffered degradation due to ungulate overuse. The National Academy of Sciences and National Research Council were mandated by Congress in 1998 to review "all available science related to the management of ungulates and the

ecological effects of ungulates on the range land of Yellowstone National Park and to provide recommendations for implementation by the Service" (HR Report 105–163; appropriations in pl 105-83). The National Research Council consists of approximately 12 experts from various fields. Two of five public meetings with the NRC were held in the Greater Yellowstone Area on January 14 and 15 and on July 9, 10 and 11, 1999. A status report was given to the Department of the Interior on October 1, 1999. A final consensus report is expected by October 2000 and will be provided to the Department of the Interior and Congress.

According to the NAS (1998) report, bison removed during management actions in 1991–92 and 1996–97 were in good to excellent body condition, indicating that even at a population size of more than 3,500 bison there is little or no evidence of inadequate forage quantity or quality. The NAS (1998) report also suggested that bison migration out of the park is related to both population size and to weather. When the bison population is above 3,000 animals, movements out of the park are closely related to measures of winter severity. Below a population size of 3,000, the magnitude of movements out of the park appear to be unrelated to winter severity and only very loosely related to population size. Research is underway to better understand the relationship between bison and habitat in the park and the relationships among bison population size, winter severity, and movements outside the park boundary. See "Bison: Vegetation/ Vegetative Communities" in this volume.

Representative Comment: 11121Q

C Comment: Herd size limits should be reviewed periodically by a cooperative team that includes wildlife professionals, agency personnel, and representatives from Indian tribes. A bison population objective should be developed by an independent body, rather than by the agencies involved in developing the environmental impact statement.

Response: The *Draft Environmental Impact Statement* (p. 54) outlines the interagency nature of bison management planning, with each agency responsible for specific actions, but all agencies collectively sharing responsibility for bison management actions. The "Purpose of and Need for Action: Objectives and Constraints — Objective 8 (DEIS, p. 30) states that the agencies are committed to basing bison management actions on factual information and to updating the management plan as new information becomes available. Review of new scientific information is a continuing process. It is anticipated that the agencies will review population objectives based on the results of current agency and independent research on the ecological carrying capacity of bison in the Greater Yellowstone Area and on bison movements related to population size and winter severity when those results become available. If new information results in significant changes in management actions or direction, these changes would be subject to additional public review. Eventually, bison population research and monitoring results may be reviewed and management recommendations made in a similar fashion to that of elk and other wildlife species that use lands under several juris dictions at varying times of year. Research and monitoring efforts and management recommendations for all Yellowstone northern range ungulates (except bison), for example, are coordinated by the Northern Range Cooperative Wildlife Working Group, consisting of biologists and managers from the National Park Service, the Montana Department of Fish, Wildlife and Parks, the U.S. Forest Service, and the Biological Resources Division of the U.S. Geological Survey. See "Objectives and Constraints: Legal and Policy Mandates" in this volume for more information.

Representative Comment: 14484H

D Comment: The analysis of carrying capacity and minimum herd size should be adjusted to include consideration of winter habitat outside of Yellowstone National Park. That analysis should include estimates both with and without livestock grazing on public lands and more detail on actual bison distribution and use of those areas. The size of the park is insufficient for maintaining a healthy bison population. Population objectives should be set according to the upcoming review by the National Academy of Sciences of ungulate population dynamics on the northern range. (See "Bison: Land Acquisitions/Easements or Winter Range" in this volume for more information on carrying capacity).

Response: In developing the purpose and need for action in this environmental impact statement, the agencies recognized that "bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions, to use some lands outside of the park's boundary. The provisions for acquiring access to additional lands outside the park boundary in some alternatives were included in recognition of the fact that in severe winters Yellowstone National Park may not provide adequate winter range for bison due to elevation and consequent snow accumulation. These provisions also recognize that bison tend to use the identified areas during some winters; however, detailed information on bison use is not available since bison have generally not been allowed to fully use those lands. In all alternatives except alternatives 5 and 6, the bison population is expected to fluctuate largely in response to weather, other environmental factors, and management removals identified in each alternative. In this volume see "Bison: Land Acquisition/Easements or Winter Range" and "Bison: Special Management Areas" for information regarding bison use of areas outside the park. Review of new scientific information is a continuing process. In 1998 the National Academy of Sciences and the National Research Council were mandated by Congress to review "all available science related to the management of ungulates and the ecological effects of ungulates on the range land of Yellowstone National Park and to provide recommendations for implementation by the Service" (HR Report 105–163; appropriations in PL 105–83). The National Research Council consists of approximately 12 experts from various fields. Public meetings were held in the Greater Yellowstone Area on January 14 and 15, and on July 9, 10, and 11, 1999. A status report was provided to the Department of the Interior on October 1, 1999. A final consensus report is expected by October 2000 and will be provided to the Department of the Interior and Congress. Information from the National Academy of Sciences review of ungulate population dynamics will be considered, along with other information from research on bison population dynamics, movements, and their relationship to climate and vegetation, in reviewing bison management programs.

Representative Comment: 15420LL

Issue 3: ***Minimum Viable Population/Genetics***

A Comment: Is 580 a minimum viable population size? There is a lack of data and conflicting information. The *Draft Environmental Impact Statement* provided no valid evidence to support the statement that reducing the herd to 580 animals would not have adverse genetic impacts, particularly since this is the only bison herd in the U.S. to continuously occupy the same area since prehistoric times. Additional analysis to address this issue was requested.

Response: Very little data regarding the minimum viable population size in bison currently exist, and no work has been done to evaluate this issue in Yellowstone bison. Given this lack of data, the agencies have relied on limited existing information to establish a number below which this population should not be allowed to go. The information provided in the *Draft Environmental Impact Statement* (p. 54) was inadvertently incorrect in citing the basis for the 580 minimum viable population size, and the source of information and the text has been changed accordingly. The agencies have relied on information provided by Lott (1987), who used computer simulations of public bison herd demographics and mating behavior to estimate that a population of at least 580 bison would be required to prevent inbreeding and potential loss of genetic diversity (based on a perceived need to maintain at least 50 individuals that contributed their genetic makeup to the next generation). The National Park Service recognizes that the Yellowstone bison herd may be genetically important. To estimate a minimum viable population for bison so that a population remains at a constant level of genetic variation (where loss due to genetic drift is the same as gains due to mutation to new alleles) requires accounting for the selective pressures brought to bear on the population, including the influences of sex ratio of breeding adults, the reproductive success of males and females, the fluctuations in population size, and the role that random chance can have on the population. Minimum viable population is not merely affected by genetic factors but also by demographic and environmental randomness and catastrophes. The effect these factors have on different taxa depends on their respective ecology and life history traits, and therefore no universal estimate of a minimum viable

population exists. However, management prescriptions that result in nonrandom selective removal of bison from the population through lethal and nonlethal mechanisms (e.g., selective removal of pregnant females, females that carry the NRAMP1 trait, or prime breeding age bulls) can negatively influence the resultant genetic integrity and viability of a population. Therefore, the National Park Service is committed to conducting research on the genetics of bison in Yellowstone, along with that of other national park system units that have bison herds. Research proposed to begin in mid-2000 will include analysis of the genetic structure of the Yellowstone herd and compare it with that of other National Park Service herds, determine whether nonrandom selection of genetic groups may be occurring in management actions, and evaluate the predicted effects of various population sizes and management strategies (NPS 1999c). The agencies have stated that they will reevaluate the minimum population size when new information becomes available and adjust that number if necessary. None of the alternatives proposes to reduce the bison population to a level of 580 bison.

Representative Comment: 11020C

B Comment: The population range set forth in alternative 7 is not large enough to ensure that genetic diversity is maintained in the bison population, particularly given the history of reductions and population bottlenecks of bison and of this herd.

Response: The agencies have agreed that if the bison population declines or is reduced to near 1,700 animals, lethal management actions would be ceased or greatly reduced to avoid allowing the population to go below that number. The bison population will be maintained at a number well above 580 bison, and no adverse effects on genetic diversity are expected to occur. The modified preferred alternative in the final environmental impact statement prescribes a population limit of 3,000 bison, which appears to be well within the genetic potential for the Yellowstone population. Under the modified preferred alternative the bison population was estimated to increase from initial starting conditions to approximately 3,250, where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of the Modified Preferred Alternative"). The Yellowstone population appears to have a relatively high level of genetic variation despite having remained at relatively low numbers since the late 1800s, possibly because it is descended from indigenous individuals, combined with animals descended from both the southern and the northern plains herds (Wilson and Strobeck 1997). As noted in the response to issue 4A above, the National Park Service is committed to conducting research on the genetic structure of the Yellowstone bison population and using those results to evaluate the potential impacts of various management actions on the population's genetic structure. Should those results indicate the potential of current management practices to reduce the genetic diversity of the bison population, the National Park Service will review management actions and recommend adjustments accordingly.

Representative Comment: 458E

C Comment: The agencies have failed to provide information on what constitutes a "genetically, biologically, and ecologically viable herd" in spite of having adopted these as guidelines for assessing alternatives. Why didn't maintaining genetic diversity within the Yellowstone bison population receive more focus in the *Draft Environmental Impact Statement* because of the importance of genetic variability on population fitness?

Response: As noted in previous responses (issue 4A above), very little information is currently available as to what constitutes a minimum viable population for bison or specifically for the Yellowstone population. Evidence of inbreeding depression has not been noted in public bison herds (Chambers 1997), and the Yellowstone population appears to have a relatively high level of genetic variation, possibly because it is descended from indigenous individuals combined with animals descended from both the southern and the northern plains herds (Wilson and Strobeck 1997).The National Park Service is committed to assessing the genetic viability of the Yellowstone bison population and the effects of various management actions on its population genetics. Additionally, research projects are currently underway to examine the relationships among bison, forage, and weather; to describe seasonal movements and habitat

use of bison and bison population structure; and to synthesize information on bison ecology and biology to model how the population functions in the Greater Yellowstone Area. The results of these research efforts are expected to provide a wealth of information on the health and status of the Yellowstone bison population and will be used to adjust management actions where necessary.

Representative Comment: 14714CC

D Comment: The *Draft Environmental Impact Statement* did not address the impacts of reduction of the Yellowstone bison population on the long-term genetic viability of the small Jackson herd, since immigrations to Jackson from Yellowstone may enhance genetic diversity in the Jackson herd.

Response: Available information on movements of bison between Yellowstone and Grand Teton National Parks and Jackson, Wyoming, indicate that very few individuals move between the two populations, and that movements have occurred only very recently. A total of nine bison are known to have moved from Yellowstone National Park to Grand Teton National Park, all in the past two years: 3 males in the winter of 1996, and 3 males and 3 females in the winter of 1997. Of those bison, only 2 of the males have survived and those do not appear to be successful in breeding; therefore, they are not contributing to the gene pool of the Jackson population. The 3 females have reproduced and have therefore made a genetic contribution to the Jackson population. Since 1997 there has been no recorded movement of bison from Yellowstone National Park to the Jackson population. The bison that moved during the winter of 1996 returned to Yellowstone during the subsequent summer, and the bison that moved south the following winter appear to have been associated with those three original males returning to the Jackson population. Movements of these bison southward during winter would not have been possible without the presence of a groomed snowmobile road on which to travel, because of extreme snow depths in that region (S. Cain, Wildlife Biologist, Grand Teton National Park, pers. comm.). Given the infrequency of these movements, the fact that not all emigrating bison successfully bred, and the unlikelihood of emigration prior to the presence of the groomed road, it is unlikely that the Yellowstone population has been important in maintaining the genetic diversity or health of the Jackson bison population. It is not known whether the movements of individual bison and their associated groups southward from Yellowstone is related to population size or other factors. If managers determine that the Jackson herd is suffering from decreased genetic diversity and that adding bison with different genetic material is required, bison could be acquired for this purpose from any one of a number of public bison herds, most of which descend at least in part from Yellowstone bison and therefore contain that genetic material.

Representative Comment: 15329M

Issue 4: *Suggested Maximum Population Size*

A Comment: Information in the *Draft Environmental Impact Statement* (pp. 146–147) indicates that the maximum population that can be supported in Yellowstone National Park without the migration of large numbers of bison is 1,800–2,000, that elimination of brucellosis in the Yellowstone population cannot be achieved as projected in some DEIS alternatives if the population remains above 1,200 bison, that the park may only be able to support 400 bison in the winter as it did before snowmobiling began, or that the bison population should be maintained at approximately 1,100 animals, based on information from M. Meagher's book (1973).

Response: The National Academy of Sciences and the National Research Council are currently reviewing all available science related to the management of ungulates and the ecological effects of ungulates on the rangeland of Yellowstone National Park in order to provide management recommendations to the National Park Service. An earlier report by NAS (1998) indicated that bison migration out of the park is related to both population size and winter severity. When the bison population is above 3,000 animals, movements out of the park are closely related to winter severity, whereas below 3,000, the magnitude of movements out of the park appears to be unrelated to winter severity and only very loosely related to population size. According to the NAS (1998) report, bison removed during management actions in 1991–92 and in 1996–97 were in good to excellent body condition, indicating that even at a population size of

more than 3,500 bison there is little or no evidence of inadequate forage quantity or quality. During six of eight winters in which the bison population entered the winter with more than 3,000 animals, the number of bison exiting the park and consequently removed did not reduce the population below approximately 3,000 animals (see DEIS, table 13, p. 147). This strongly suggests that in all but the most severe conditions the park is capable of supporting at least 3,000 bison throughout the winter.

Use of the roads by over-snow machines began in the late 1960s, and mechanical grooming started in 1970–71. At that time the bison population was approximately 600 animals and was increasing after the large annual removals conducted during the 1950s and 1960s were discontinued. The population continued to increase and analysis indicates that the population growth was unaffected by the implementation of road grooming (NAS 1998). Research is underway to better understand the relationship between bison and habitat in Yellowstone National Park, as well as the relationships among bison population size, winter severity, and movements outside the park boundary, and to develop an ecological carrying capacity for bison in the Greater Yellowstone Area. Results are anticipated in mid-late 2001 and 2002. The agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of this management plan."

Representative Comment: 5638G

B Comment: The plan should provide for a herd of several thousand free-roaming bison in the Greater Yellowstone Area, and the removal of bison from Yellowstone National Park should not occur until the herd has reached a size sufficient for "future recolonization of suitable public lands surrounding the parks."

Response: The agencies considered but rejected alternatives that contained no lethal control and would have allowed the bison population to increase without restriction (see DEIS, p. 112). This course of events would not meet the purpose of and need for a management plan, which is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana" (DEIS, p. 11). The agencies felt that allowing the bison population to expand without restriction would increase the risk of transmission of brucellosis to cattle. Bison may be allowed to occupy some public lands surrounding the park, as designated by the agencies under each alternative. A major element of management of the risk of transmission is maintaining adequate temporal or spatial separation between bison and cattle. It should be noted that bison are not likely to occupy all of the areas where they would be allowed in even the largest SMAs delineated in the environmental impact statement (alternative 2). Large portions of the SMAs would be unavailable to bison due to topography and snow depths that inhibit travel and access to forage. The stippled areas on the environmental impact statement alternative maps indicate the actual areas bison would be expected to use, based on topography, elevation, and snow depth. See "Bison: Land Acquisitions/Easements or Winter Range" (issue 3E) and "Bison: Special Management Areas" in this volume.

Representative Comment: 1303D

Issue 5: ***Maintaining Population within Stated Objectives***

A Comment: Will the agencies manage a bison population near the maximum allowable size or near the minimum? Will the commitment to remove bison outside SMAs take precedence over the commitment to maintain the population at or above 1,700 bison? Alternative 7 appears to rely on not having further migration out of the park in the Stephens Creek area after the population has decreased to 1,700 or lower, since continued operation of the capture facility as required in the alternative would decrease the population even more. Therefore, does alternative 7 truly address the objective of maintaining a viable bison population?

Response: NAS (1998) indicated that bison migration out of the park is related to both population size and winter severity. When the bison population is above 3,000 animals, movements out of the park are

closely related to winter severity, whereas below 3,000, the magnitude of movements out of the park appears to be unrelated to winter severity and only very loosely related to population size. According to the NAS (1998) report, bison removed during management actions in 1991–92 and in 1996–97 were in good to excellent body condition, indicating that even at a population size of more than 3,500 bison there is little or no evidence of inadequate forage quantity or quality. The modified preferred alternative prescribes a population limit of 3,000 bison that appears to be well within the ecological potential for the Greater Yellowstone Area.

Representative Comment: 11409AP

B Comment: There are a variety of measures by which to maintain the population within stated objectives, including regulated harvest, transfer of live animals to Indian reservations ("Citizens' Plan"), or use of government or contract sharpshooters.

Response: The range of alternatives presents a variety of tools to manage the bison population, including establishing a hunting season, using quarantine to remove live animals (see "Bison: Capture/Test/Slaughter Operations," "Bison: Distribution (Live)," and "Bison: Quarantine Operations" in this volume. The use of agency shooting is included in alternatives only to remove bison that cannot be captured and tested in capture facilities. Whether this is accomplished through the use of hunters, transfer to quarantine, or agency or contract sharpshooters, the impact on the bison population is the same, although the number of bison removed varies from alternative to alternative (see volume 1, "Impacts on Bison Population" for more information).

Representative Comment: 178C

C Comment: The bison population size should be controlled by sterilization or immunocontraception, rather than by lethal means.

Response: The *Draft Environmental Impact Statement* (pp. 39–40) addresses some of the difficulties in considering contraception or sterilization as population control techniques. To date, no free-ranging large mammal population has been effectively controlled using available contraception techniques (B. Garrott, Montana State University, pers. comm.). Aside from uncertainties as to their effectiveness, "significant behavioral changes can be expected for all major contraceptive agents currently under investigation" (Garrott 1995). Contraceptive agents could disrupt family and social bonds and extend or alter breeding and birthing seasons (Garrott 1995). Furthermore, the technology does not currently exist by which to effectively administer contraceptive agents to free-ranging populations of large mammals (Garrott 1995). The need for an optimum combination of availability of animals to treat, the proportion of animals that can be successfully treated, and the efficacy of the method used is likely to render currently available techniques relatively ineffective (Garrott 1995) in a free-ranging population spread over a large, geographically varied area. For these reasons, this method of population control has not been considered further as a means for limiting bison population size.

Representative Comment: 46C

D Comment: Population control should not proceed until formal scientific procedures for estimating population size with an acceptable level of accuracy have been established.

Response: The National Park Service is currently supporting research that is expected to improve population estimates and provide a greater measure of accuracy in those estimates. This research is anticipated to be completed by late 2000 or early 2001. To date, preliminary results indicate that current population estimates closely match those being developed by researchers (Hess et al. 1999 unpubl. report). When new techniques resulting from current research become available, they will be used and any new estimates of population size will be considered by the agencies in establishing annual management priorities.

Representative Comment: 524A

E Comment: Population objectives could be met by killing a varying number of bison in remote areas within the park boundary, with carcasses left to benefit scavengers (for additional information refer to volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species").

Response: The policies of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, unregulated by human removals within the park to the maximum extent possible (NPS 1988). In keeping with these policies, none of the alternatives calls for culling bison inside the park boundary specifically for the purpose of controlling population size. Some alternatives would result in bison that could not be captured to be shot inside the park; in those cases, the carcasses would be retained within the park for consumption by scavengers, with the exception of a few that might be removed for research, educational, or cultural purposes.

Representative Comment: 10350P

Issue 6: ***Effects of Alternatives on Bison Population***

A Comment: The *Draft Environmental Impact Statement* provides, and the National Park Service has, very little information about behavior, social dynamics, and age and sex structure of the Yellowstone herd by which to evaluate the impacts of alternatives. The agencies have not demonstrated that the proposed management activities will not affect the demographics of the bison population (selective removal of seropositive bison). Will maintaining the population within the established population objectives ensure the population's ability to recover from natural fluctuations?

Response: The modified preferred alternative in the final environmental impact study prescribes a population limit (of 3,000 bison) that appears to be well within the ecological potential for the Greater Yellowstone Area. Under the final environmental impact statement modified preferred alternative, using the deterministic model, the bison population was estimated to increase from initial starting conditions (2,100 bison) to approximately 3,250 bison, where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on the Bison Population — Impacts of the Modified Preferred Alternative"). A stochastic bison population model was used to analyze the consequences of the alternatives (see volume 1, "Environmental Consequences: Impacts on the Bison Population — Methodologies for Analyzing Impacts"). In order to buffer the capacity of the bison population to respond positively to natural fluctuations in population size and demographics, the modified preferred alternative also proposes to limit the unnecessary killing of seronegative pregnant females. (See response to 6B below for more information.)

Representative Comment: 14714CC

B Comment: The *Draft Environmental Impact Statement* provided no analysis of the potential impacts of the alternatives (especially the preferred) on the social structure of the population, especially given the likelihood that significant numbers of mature adult females would be removed. The reduction of the bison population, particularly through capturing and testing, has the potential to act as an agent of artificial selection on the population, favoring the retention of more "domestic" physical and behavioral traits that may not enhance survival of the bison in a wild state. This may include removal of the migratory segment, which may have a negative impact on the ability of the herd to survive harsh winters.

Response: Some scientists have stated that the bison gene pool as a whole is not in danger of suffering serious effects of inbreeding depression, but that specific management practices resulting in artificial selection of particular genotypes may ultimately compromise individual herd gene pools (Chambers 1997). However, unlike some public herds where bison are culled to maintain population size and are sold to private citizens or other entities, management actions to remove bison from the Yellowstone population would not be geared to removing or retaining bison with any specific physical or behavioral

characteristics other than serological status. Data from the winter of 1996–97 indicate, however, that capture and testing operations carried out on large numbers of bison may have the effect of differentially removing particular sex or age classes of bison. The composition of the bison removed along the north boundary after the National Park Service began testing and removing only seropositive bison shifted to a higher proportion of mature, pregnant adult females than prior to testing when all exiting bison were removed (Gogan et al., USGS-BRD, unpubl. data). In alternatives where removals would be based on serological status, slightly more adult males than adult females would likely be removed from the population. In alternatives that include the removal of seronegative pregnant females, as well as all seropositive bison, more adult females than adult males would be removed. Conducted over time, the removal of adult females based on both serological status and pregnancy status would result in the removal of most adult females captured. This would change the population's sex structure to favor males. Additionally, because a higher proportion of older bison are seropositive, removing seropositives would eventually shift the population age structure toward younger age-classes (see issue 6A above). Whether this type of selection would result in the removal of specific behavioral traits, migration habits, knowledge, or other characteristics is not known at this time. Captures and removals of bison conducted mid-century during the period of intensive management of all park ungulates did not appear to impact the ability of the bison population, once artificial control was stopped in 1968 to increase in number, expand into previously unoccupied habitat. Research efforts are underway to better understand the implications of a variety of management actions on the composition of the bison population (P. Gogan, USGS BRD, pers. comm.). Linking any potential effects on population structure to specific physical or behavioral characteristics is not likely to be possible without intensive, long-term research. The modified preferred alternative prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Yellowstone ecosystem. Under the modified preferred alternative, the bison population, using the deterministic model, was estimated to increase from initial starting conditions (2,100 bison) to approximately 3,250 where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of the Modified Preferred Alternative"). A stochastic bison population model was used to analyze the consequences of the alternatives (see volume 1, "Environmental Consequences: Impacts on Bison Population — Methodologies for Analyzing Impacts"). In order to buffer the capacity of the bison population to respond positively to natural fluctuations in population size and demographics, the modified preferred alternative also proposes to limit the unnecessary killing of seronegative pregnant females.

Representative Comment: 15420X

C Comment: The bison population should be allowed to reach the predicted long-term maximum of 3,500, which would allow bison to fully inhabit the park and would benefit grizzly bears and other species. Others stated that maintaining the bison population at an artificially low number will have negative impacts on other wildlife populations that depend on natural fluctuations in the bison population (See "Wildlife: Predators and Scavengers/Ungulates" in this volume) and on the ecosystem as a whole.

Response: Under all alternatives except 5 and 6 the bison population would be allowed to fluctuate largely in response to environmental factors, with management actions influencing bison numbers only during winters when significant numbers of bison move beyond the areas established for their use as winter range. The modified preferred alternative in the final environmental impact statement prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Yellowstone ecosystem. Under the modified preferred alternative, using the deterministic model, the bison population was estimated to increase from initial starting conditions (2,100 bison) to approximately 3,250, where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of the Modified Preferred Alternative"). The bison population expected under each alternative is described in volume 1, "Environmental Consequences: Impacts on the Bison Population." It is anticipated that under all alternatives except 5 and 6 that bison would continue to occupy all areas of the park in which they are currently found and would continue to provide a food resource to grizzly bears and other wildlife. The consequences of each alternative on other wildlife species, including grizzly bears, are discussed in volume 1, "Environmental Consequences: Impacts to Other Wildlife" and "Impacts to Threatened and Endangered Species." Also see "Wildlife: Threatened

and Endangered Species" and "Wildlife: Predators and Scavenger Ungulates" in this volume for more information.

Representative Comment: 355C, 1862B, 511C

D Comment: Population objectives consider maintaining the bison population at a level to provide for viewing opportunities by Yellowstone National Park visitors.

Response: The agencies recognize the importance of bison viewing to park visitors (see DEIS, p. 152). In some alternatives, however, attempts to eliminate brucellosis in bison by means of parkwide test and slaughter programs or attempts to reduce the chances of bison coming in contact with cattle by limiting bison population size would take precedence over providing extensive bison viewing opportunities to park visitors. The analysis of consequences indicated a higher degree of visitor satisfaction for those alternatives maintaining a higher bison population than those in which the population would be substantially reduced. Please refer to volume 1, "Environmental Consequences: Impacts on Recreation" and "Impacts on Visual Resources," and comment responses on these subjects in this volume for more information on the expected effects of bison management on bison viewing opportunities.

Representative Comment: 5455D

Issue 7: ***Policy Questions***

A Comment: The National Park Service does not have the authority to remove or kill bison that have not been determined to be "surplus," and surplus bison can only be identified after a carrying capacity for the park has been established. Furthermore, the removal of bison to maintain a population objective is in violation of National Park Service policies.

Response: The act of August 25, 1916 (16 USC 1, 2, 3, as amended) and other authorities give the National Park Service authority to manage national parks and their resources. The act of January 24, 1923 (16 USC 36) regarding the authority to sell or otherwise dispose of surplus bison is not the only authority regarding the management of bison. Recent court rulings on lawsuits in which the *Interim Bison Management Plan* (which involves the removal of bison inside the park boundary at the Stephens Creek capture facility) was challenged upheld the authority of the National Park Service to carry out such actions as part of the overall management of a bison population exposed to a transmissible disease to livestock (ITBC/GYC vs. USDI)

Representative Comment: 15420PB

Issue 8: ***Objectives — Purpose in Setting Population Objectives***

A Comment: If the bison population is to be managed at a specific population objective, it should be for "the good of the bison and Yellowstone" and not to benefit private ranchers. Preventing contact with cattle, and therefore the transmission of brucellosis, does not require limiting the bison population to below 2,500 animals but only separation in space during critical time periods. The purpose of the *Draft Environmental Impact Statement* is not to decide bison population limits.

Response: The stated purpose of and need for a bison management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana" (see DEIS, p. 11). Therefore, all alternatives considered by the agencies must meet both of these needs. The agencies agreed that one of the objectives of the plan is to "address bison population size and distribution" and to "have specific commitments relating to size of the bison herd" (DEIS, p. 29). A population size of approximately 3,000 was identified as a "rule of thumb" (NAS 1998) above which the frequency and size of bison movements to areas outside the park would increase. Below that level the probability of movement and the size of the movement is much lower. A major component of risk management is maintaining spatial or temporal

separation between bison and cattle. The modified preferred alternative prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Yellowstone ecosystem. Under the modified preferred alternative, using the deterministic model, the bison population was estimated to increase from initial starting conditions (2,100 bison) to approximately 3,250 bison, where it would remain over the life of the plan (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of the Modified Preferred Alternative"). Furthermore, the modified preferred alternative prescribes a stepwise adaptive risk management program wherein some untested bison would be allowed onto traditional winter range outside Yellowstone National Park, subjected only to capture as needed to maintain tolerance limits and to maintain temporal and spatial separation objectives (see volume 1, "The Alternatives: Alternative 8: Modified Preferred Alternative").

Representative Comment: 8626B

Issue 9: ***Additional Data/Analysis — Corrections***

A Comment: The *Draft Environmental Impact Statement* does not provide adequate information about recent (past 15 years) and current bison herd composition, reproductive and mortality rates, and whether recent removals have had an impact on bison population structure and function (specifically on reproductive rate). This information is necessary to adequately project population trend for any alternatives.

Response: The final environmental impact statement has been modified to add this information (see volume 1, "Affected Environment: Bison Population, Breeding, Calving and Sex and Age Classes;" also see "Environmental Consequences: Impacts to Bison Population" for additional demographic information).

Representative Comment: 11409ARR

B Comment: The *Draft Environmental Impact Statement* only discusses the impacts of bison removals in terms of total population size, but it should also discuss the impacts to specific, localized population segments and overall population distribution. This information has important implications for adequately analyzing overall impacts of the proposed alternative.

Response: Available information was used to estimate the effects of the various alternatives on overall populations. Overall distribution is not expected to be markedly different than what has occurred over the last several decades at population ranges that are comparable to the various alternatives. On a smaller scale it is anticipated that under all alternatives except 5 and 6 bison would continue to occupy all areas of the park where they are currently found. In alternatives 5 and 6 it is likely that several areas within the park where small segments of the population currently reside might be devoid of bison for a period of years following the test and slaughter phases of these alternatives. Data are not available to estimate effects on scales smaller than the larger population segments.

Representative Comment: 11409ARR

C Comment: An analysis should be conducted of outmigrations expected from a population limited to approximately 1,200 bison.

Response: NAS (1998) indicated that bison migration out of Yellowstone National Park is related to both population size and weather. Below a population size of 3,000, the magnitude of movements out of the park appears to be unrelated to winter severity and only very loosely related to population size. Therefore, it is not possible to predict with any degree of accuracy the number of bison that would be expected to leave the park if the bison population were at or below 1,200 bison. However, bison movements to areas outside the park have been recorded when counts of the population were as low as 226 (Meagher 1973).

Representative Comment: 15543N

D Comment: The information provided in the *Draft Environmental Impact Statement* regarding factors driving movements of bison out of Yellowstone National Park is questionable. There are apparent contradictions within the text and between the *Draft Environmental Impact Statement* and the NAS report (1998) as to whether food availability, winter severity, or population size is more important. More information from the report must be considered in the environmental impact statement analyses.

Response: The National Academy of Sciences 1998 report undertook to understand the factors that contribute to bison movements beyond park boundaries and the relationships between bison movements, winter severity, food availability, and road grooming. This review of the available data indicates that migrations out of the park may be primarily related to the interaction of population size and weather (please refer to the above comment).

Representative Comment: 9364PP

E Comment: The *Draft Environmental Impact Statement* is incorrect in stating that the population will fluctuate between 1,700 and 3,500 over time, given that the past population trend has been increasing steadily rather than varying around an average. Is the predicted maximum population size of 3,500 credible given that the bison population was at 4,200 animals in 1994?

Response: Boyce (1990) (see DEIS p. 196) used a range of conditions based on actual data on summer forage production and winter severity, both of which appear to influence bison population dynamics, to model the Yellowstone bison population over time. He found that the combination of occasional severe winters and drought summers, along with a relatively low level of predation by wolves, tended to keep the modeled population between about 1,700 and 3,500 bison. These numbers are an estimate of the expected range within which the population may fluctuate. As with any prediction of population trend, it is expected that actual numbers may not exactly match the predicted range. In the analysis conducted by the National Academy of Sciences (NAS 1998) , a population size of approximately 3,000 was identified as a "rule of thumb," above which the frequency and size of bison movements to areas outside the park would increase. Increased frequency of management removals above this population level is likely to act as an additional regulatory mechanism, keeping the population within the predicted range. The modified preferred alternative prescribes a population limit of 3,000 bison, which appears to be well within the ecological potential for the Yellowstone ecosystem.

Representative Comment: 11121U

F Comment: The statement in most *Draft Environmental Impact Statement* alternatives, that "the bison population would be managed primarily through natural processes inside Yellowstone National Park" is not feasible; use by bison of a winter-groomed road and consequent population and distribution changes will ensure "major movements of bison outside park boundaries regardless of population size." Information in the 1997 *Bison Symposium Proceedings* should be included in the EIS analysis. The environmental impact statement must include a more thorough analysis of the relationship between winter-groomed roads and bison population size and movements out of the park.

Response: The National Academy of Sciences report (NAS 1998) indicated that bison migration out of the park is related to both population size and to weather, but the relationship between movements and either factor is not directly proportional nor very predictable. Groomed roads may have contributed to the redistribution of bison within park boundaries (Meagher 1997). It appears that bison tend to use waterways and off-road trails that they maintain for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward park boundaries may occur on such routes. However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas, and westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). However, the maintenance of a trail system by bison, independent of the road system, seems to allow movement of bison between all areas of the winter range (i.e., Hayden Valley to the Firehole River and through Cougar Meadows) now that knowledge of existence and location of these areas has been incorporated by the

population. Additionally, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (see volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 15420IA

G Comment: The long-term testing and slaughter outlined in some DEIS alternatives "contradict the proposed increase in the bison population" indicated under some alternatives (e.g., alternative 3).

Response: The analyses predicting bison population sizes resulting under each alternative (see volume 1, "Environmental Consequences: Impacts on Bison Population") took into consideration the level of test and slaughter anticipated under each alternative. Although it is not possible to exactly predict the numbers of bison that would be subject to test and slaughter operations, the population analyses were based on long-term averages of bison exiting the park and therefore subject to such operations.

Representative Comment: 9144J

H Comment: The analysis predicting the number of bison likely to leave the park under three different scenarios is flawed because it underestimates the number that may leave in a severe winter (such as in 1996–97). Proper analysis must include the development and use of accurate data about the numbers of bison that may leave the park in order to analyze the impacts of management alternatives.

Response: While it may not be possible to predict exactly the number of bison that would be expected to leave the park under specific winter weather conditions, the *Draft Environmental Impact Statement* analyzed three different levels of population movements, including a severe winter such as 1996-97, out of the park, based on the actual range of observed movements. The proposed management actions for each alternative were applied to estimate the level of removal for each alternative under those movement scenarios (see DEIS, "Environmental Consequences: Impacts on Bison Population," and under each alternative look at "Stochastic Influence on Bison Population"). Since the completion of the *Draft Environmental Impact Statement*, the agencies have re-analyzed impacts of each alternative to the bison population using a more complex and refined stochastic model. The results of this modeling effort are presented in volume 1, "Impacts to Bison Population."

Representative Comment: 15420LL

Property Damage (BI-14)

Issue 1: ***Property Damage That Has Occurred by Bison in Different Areas Surrounding Yellowstone National Park***

A Comment: If bison threaten private lands or human safety, is it reasonable to adopt nonlethal methods of removal? Who maintains records of property damage as a result of bison?

Response: When bison leave Yellowstone National Park, they are no longer within the jurisdiction of the National Park Service, and management is governed by Montana statutes (81-2-201, MCA, 81-2-120, MCA, and 87-1-216, MCA). The Montana Department of Livestock, with assistance from other agencies, removes bison known or suspected to be carrying a disease on public land or, with a landowner's permission, on private property. The method of removal varies depending on the situation. Each agency is responsible for keeping their own records on property damage due to bison.

Representative Comment: 9E, 13421G

B Comment: There is a public safety concern of highway accidents from hitting bison.

Response: Bison are treated as any other wildlife species on public highways. The public is responsible for driving safely. The National Park Service manages bison inside Yellowstone National Park boundaries. Outside the park in Montana, wildlife-management and wildlife-damage cases are supervised by the Montana Department of Fish, Wildlife and Parks. This authority extends into the Gallatin National Forest in Montana. Prior to 1994, the Montana Department of Fish, Wildlife and Parks was responsible for managing and recording bison-related complaints and incidents. Numbers and types of bison incidents that have been recorded are discussed in the environmental impact statement. See volume 1, "Affected Environment: Livestock Operations — Property Damage by Bison" for more information.

Representative Comment: 15316Y

C Comment: Hazing should take place when private property is threatened, and it should be conducted by Montana Fish, Wildlife and Parks or volunteer groups.

Response: Under Montana statute (81-2-120, MCA), the Montana Department of Livestock, with assistance from other agencies, removes bison known or suspected to be carrying a disease on public land or, with a landowner's permission, on private property. Other agencies may assist in the effort at the request and with the permission of the Montana Department of Livestock.

Representative Comment: 10692J

D Comment: Agencies should begin a program for compensation to landowners for damage done to fences and other structures.

Response: Alternatives include the provision to haze bison off private property, in part to prevent property damage. However, as the environmental impact statement indicates, damage does sometimes occur (see volume 1, "Environmental Consequences: Impacts on Livestock Operations").

Representative Comment: 65B, 2979B, 10692J, 15420IB, 15530D

E Comment: Fences must be the primary way to minimize the "risk to public safety and private property damage by bison." Require landowners to fence their private property.

Response: The agencies cannot legally demand the public to fence their private property. The environmental impact statement addresses fencing, stating that this method does not deter bison, and

estimates the expense of this suggestion. See volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Objectives, Alternatives, and Issues from Public Comments" for more information.

Representative Comment: 15118C, 5436A

Quarantine Operations (BI-15)

Issue 1: ***Purpose of a Quarantine Facility***

A Comment: What does quarantine mean? The *Draft Environmental Impact Statement* does not describe how bison will be released from quarantine or what the quarantine conditions will be like.

Response: In the context of managing Yellowstone area bison, quarantine means that the animals initially testing negative for exposure to brucellosis will be held for a specified period of time until they have completed a prescribed series of tests in order to determine that they are indeed free of the *B. abortus* bacteria. At that time, they can be released to appropriate recipients. At a minimum, all bison must have three consecutive negative serological (blood) tests, with at least 12 months between the first and last tests to complete the quarantine protocol. This is because the disease can take a long time to incubate, and a bison testing negative initially may "seroconvert" or subsequently test seropositive as the bacteria multiply. This is especially true of females who are or become pregnant. The quarantine and testing procedure is different for the different classes (e.g., males, calves, pregnant females, etc.) of bison. The protocol is outlined in appendix B of volume 1.

A quarantine facility would give agencies the flexibility they do not now have in the disposition of seronegative bison. For example, under the terms of the current *Interim Bison Management Plan*, bison are prevented from crossing the northern boundary of Yellowstone National Park at Reese Creek because the adjacent land is private and occupied by cattle throughout the year. All bison captured at the Stephens Creek facility are to be shipped to slaughter. The use of a quarantine facility would limit the lethal control of these animals and would provide bison certified as being free of brucellosis that could be released to Native American tribes, parks, preserves, or other appropriate recipients.

Representative Comment: 15118E

B Comment: Some commenters stated quarantine will be effective in controlling brucellosis transmission; others stated it would not.

Response: Quarantine is not intended to control transmission in the general bison population. It is intended to eliminate the risk of transmission from bison that are released from quarantine and is designed to minimize transmission among those bison in the facility.

A bison quarantine facility would be used to test bison to qualify these animals as brucellosis free. Prior to entering the facility, bison must test negative on official brucellosis serological tests. Bison entering the facility would be divided into groups and tested a number of times over a prescribed period of time. If any in the group are found to be reactors, the rest of the group must restart the testing protocol. Those bison that qualify as brucellosis free could be released to Native American tribes, parks, preserves, or other appropriate recipients. The new owners must agree to have the bison tested at approximately six months and again at one year after release from the quarantine. The owners must also agree to keep the bison separate from all other animals until the six-month test has been completed. This quarantine and testing protocol have been determined to be sufficient by federal and state animal health authorities to prevent the spread of brucellosis.

Representative Comment: 4658C

C Comment: Quarantine should only be used if it is part of a commitment to eliminate brucellosis in Yellowstone.

Response: As noted above in issue 1B, quarantine is not intended to control transmission in the general bison population, nor will it help in preventing transmission between potentially infectious bison and cattle to any significant extent. Only seronegative bison are held in quarantine. A quarantine facility is intended to give the agencies flexibility in disposing of seronegative bison, and to provide a means of

releasing certified brucellosis-free bison to Native American tribes, public parks, preserves, or other appropriate recipients.

Representative Comment: 14845E

D Comment: Eliminate brucellosis from the bison herd by vaccination and quarantine, not slaughter.

Response: None of the management tools proposed in the alternatives in the environmental impact statement would result in the elimination of brucellosis from the bison herd, and the elimination of brucellosis is not an objective of the bison management plan. Some alternatives, including the modified preferred alternative, use vaccination and quarantine extensively to manage bison. Even so, capture, test, and slaughter operations are sometimes needed, either to maintain population size or to distribute bison outside the park. Because quarantine is likely to have little effect on disease management in the bison herd, and vaccination is less than 100% effective, a mechanism to control distribution is required.

Representative Comment: 1496A

E Comment: The use of a quarantine facility inside the park boundaries is a debatable technique for use in the context of wildlife management.

Response: The location of the quarantine facility is unknown, but it is unlikely that it would be located inside the park boundaries. Any decision about the location or design of such a facility would occur in a subsequent NEPA process if it included federal involvement. The commenter is correct in noting quarantine is unusual in wildlife management. However, the Yellowstone herd is brucellosis-affected and is managed differently than traditional wildlife because of it. Therefore, quarantine is proposed in some alternatives to (1) give agencies the flexibility they do not now have in the disposition of seronegative bison, (2) limit lethal control of some animals that wander out of Yellowstone National Park, and (3) provide certified brucellosis-free bison that could be released to Native American tribes, parks, preserves, or other appropriate recipients.

Representative Comment: 5638J

F Comment: A quarantine facility could minimize the senseless slaughter of "any and all bison" that leave the park boundary during harsh winters.

Response: Unfortunately, this statement is not true. Roughly half of all bison tested will be seropositive and, in most alternatives, will be sent to slaughter. Notable exceptions to this include alternatives that allow untested bison outside the park (alternatives 2, 3, and the modified preferred alternative). In addition, the capacity of a quarantine facility will be limited. Thus, while a quarantine facility would reduce slaughter to some degree, that effect would be limited.

Representative Comment: 7563A

G Comment: Ending quarantine would maintain a wild, free-roaming herd.

Response: At this time, no bison are quarantined, so there is nothing to end. As noted above, the intent of the bison quarantine facility is to provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients and to minimize lethal control of bison that leave the park. Although individual bison in the quarantine facility would no longer be considered wild or free-roaming by NPS standards, and so could not be returned to the park upon release (they would also be kept from returning to the Yellowstone herd because they could be reinfected), they would be available to join or begin free-roaming herds on other lands. The majority of the herd would not be quarantined in alternatives where this is a proposed management technique and would remain wild and free-roaming.

Representative Comment: 8351H

H Comment: Quarantine facilities, should not become de facto test and slaughter facilities, and they also should be dismantled once the goals of the plan have been met.

Response: A bison quarantine facility would be designed to minimize the number of bison sent to slaughter, rather than become "de facto test and slaughter facilities." Once in quarantine, bison will be held in small groups and tested periodically to curtail the numbers exposed to those that seroconvert and/or show clinical signs of brucellosis while in quarantine. (See volume 1, "The Alternatives: Alternative 3, Quarantine" for more information.) Minimizing the number of bison that become exposed will also minimize the number that will have to be sent to slaughter from the quarantine facility.

Representative Comment: 5638C

I Comment: The real purpose of quarantining the Yellowstone bison is to ensure that buffalo do not roam free so they don't cause problems for livestock grazing on public lands bordering the park. The quarantine facilities used would be nothing more than a feed lot.

Response: As noted above, the purposes of the bison quarantine facility are to give agencies the flexibility they do not now have in the disposition of seronegative bison, provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients, and to minimize lethal control of bison that wander out of the park.

As stated in the environmental impact statement (see volume 1, "The Alternatives: Alternative 3 Quarantine"), "Possible designs and costs for a quarantine facility vary widely from a small feedlot-type approach to multiple pasture operation." Even if the quarantine facility was a "small feedlot-type approach," it would differ from a traditional feedlot in that the bison would likely be kept in small groups, they would be tested periodically, and those successfully completing the protocol would be released.

Representative Comment: 15545H

J Comment: The quarantine facility could be used to evaluate brucellosis vaccines on seronegative bison

Response: If a vaccine is approved for Yellowstone National Park bison, its use will probably include bison that are in the quarantine facility. Any evaluation of vaccines at the quarantine facility would be limited to safety studies; challenges with field strain *Brucella* — as needed to test efficacy — would defeat the purpose of the quarantine facility because the facility's purpose is to produce brucellosis-free bison. It should be noted, however, that use of brucellosis-exposed bison, even those that initially test seronegative, greatly complicates even safety studies. Some bison can test seronegative while harboring field strain *B. abortus,* then seroconvert in late pregnancy, after giving birth, or after aborting. Therefore, some of the bison used in the study (i.e., those that seroconverted) would have to be eliminated from the study. This would prevent the introduction of an uncontrolled variable that would make interpretation of results very difficult.

Representative Comment: 9097E

K Comment: In 1997–98 there were changes to the *Interim Bison Management Plan* whereby the Stephens Creek capture facility could be used to test bison and the seronegative bison could be held over the winter, then released back into Yellowstone National Park in the spring. This sounds like a precursor to the quarantine facility mentioned in the *Draft Environmental Impact Statement*.

Response: The Stephens Creek facility was used to hold the seronegative bison temporarily until they could be hazed back into the park. They were not held and tested long enough to be considered brucellosis free, so they could not be relocated to other premises, which is the intent of the quarantine facility.

Representative Comment: 11409ABB

L Comment: When bison cannot be hazed back into the park during the spring, why are they not transferred to the quarantine facility?

Response: No quarantine facility exists yet, and none is included in alternative 1, the continuation of current management practices. Quarantine is part of alternatives 3, 4, 7, and the modified preferred alternative; if one of these alternatives was selected for implementation, a second NEPA process to decide the location and design of the facility would be completed. Should a quarantine facility be built, it might very well be used to house seronegative bison that cannot be hazed back into the park but can be hazed into a capture facility.

Representative Comment: 14819RR

M Comment: It is a ridiculous attempt to keep cattle away from bison through quarantining them.

Response: The purpose of the quarantine facility is not to keep cattle away from bison, but to provide bison that have been certified as being free of brucellosis to be released to Native American tribes, parks, preserves, or other appropriate recipients. Many of these animals might otherwise be killed, even if they are seronegative, if they leave the boundaries of Yellowstone National Park.

Representative Comment: Form 9G

Issue 2: *Opposition to or Support of a Quarantine Facility*

A Comment: Quarantining bison is unacceptable because bison are wildlife and should not be managed like domestic livestock.

Response: To many commenters, bison are clearly wildlife and should be managed as wildlife by a wildlife agency. Inside Yellowstone National Park, they are managed as wildlife — that is, through the use of natural regulation where predators, weather, and other forces are allowed to proceed without human interference. However, because they may carry brucellosis and could transmit it to cattle, they are managed for disease control in Montana. Accordingly, bison are managed not quite like wildlife and not quite like livestock. Quarantine prevents the killing of some seronegative bison, because it provides an option for housing and testing them (see "Issue 9: Protocol Proposed for Bison" below) when the Montana Department of Livestock or private residents outside the park will not tolerate them. Once bison complete the quarantine procedure and are certified as being free of brucellosis, they will be released to Native American tribes, parks, preserves, or other appropriate recipients where they and their offspring will have the ability to once again roam freely without the confinement and handling that occurred in the quarantine facility. In some cases (such as in parks or preserves), this could mean their return to wildlife status.

Representative Comment: 199D

B Comment: A quarantine facility is unworkable, not feasible, and ineffective.

Response: The people who designed the bison quarantine protocol did so with the intention that it would be workable, feasible, and effective. A quarantine facility would give agencies the flexibility they do not now have in the disposition of seronegative bison. For example, under the terms of the current *Interim Bison Management Plan*, bison are prevented from crossing the northern Yellowstone National Park boundary at Reese Creek because the adjacent land is private and occupied by cattle throughout the year. All bison captured at the Stephens Creek facility are to be shipped to slaughter. The use of a quarantine facility would limit lethal control of these animals and could provide bison certified as being free of brucellosis to be released to Native American tribes, parks, preserves, or other appropriate recipients.

Representative Comment: 9399C

C Comment: A quarantine facility is impractical, too costly, not sufficiently economical, and a waste of tax dollars.

Response: Cost-effectiveness is a subject about which there is disagreement and debate. Due consideration of all sides of the cost-effectiveness question should be part of the future NEPA process needed for the quarantine facility. Cost-effectiveness is determined in part by the perceived value of the outcome relative to the cost. Clearly there is considerable disagreement concerning these relative values. For some potential recipients, Yellowstone bison have unique qualities (e.g., genetic, cultural, and religious) whose value exceeds the cost of quarantine. Others feel that saving the life of a bison cannot be equated to dollars and cents.

Representative Comment: 115D

D Comment: Many commenters simply opposed a quarantine facility without giving reasons.

Response: A quarantine facility would give agencies the flexibility they do not now have in the disposition of seronegative bison. For example, under the terms of the current *Interim Bison Management Plan*, bison are prevented from crossing the northern Yellowstone National Park boundary at Reese Creek because the adjacent land is private and occupied by cattle throughout the year. All bison captured at the Stephens Creek facility are to be shipped to slaughter. The use of a quarantine facility would limit lethal control of these animals and would provide bison certified as being free of brucellosis to be released to Native American tribes, parks, preserves, or other appropriate recipients.

Representative Comment: 90K

E Comment: Some commenters simply supported a quarantine facility without giving reasons.

Response: Comments in support of the quarantine facility will be taken into consideration in the final evaluation and selected of an alternative for implementation.

Representative Comment: 238B

F Comment: Quarantine facilities are needed. Bison should not be transported from the park area until the entire herd is free of brucellosis because there are no adequate quarantine facilities and there is no testing protocol to ensure that exposed bison are free of the disease.

Response: None of the alternatives would involve the transportation of live bison from the park area (except under certain circumstances such as for slaughter or research) without completion of a quarantine protocol because of the brucellosis status of the herd. Seronegative bison that complete the quarantine protocol described in volume 1, appendix B, and are certified as free of brucellosis would then be released to Native American tribes, parks, preserves, or other appropriate recipients if the selected alternative includes quarantine as an option. If it does not, live bison would stay only in the defined impact area.

Representative Comment: 9243D

G Comment: Quarantine facilities should be put in use as soon as they are available.

Response: If the use of the quarantine facility is approved, it will be put into use as soon as it is constructed and able to be operated.

Representative Comment: 194E

H Comment: Capture and quarantine should be attempted before shooting.

Response: We are assuming the commenter is referring to the practice of shooting bison that are unresponsive to hazing and cross the Reese Creek boundary onto private land. This occurred particularly in the winter of 1996–97. Although some bison may have been captured and tested, no facility existed or exists today where they might be relocated. This is one of the reasons the agencies have added quarantine as a part of several alternatives, as it would provide flexibility in the disposition of live bison testing seronegative and crossing out of the park onto private land. In addition, the U.S. Forest Service in 1999 acquired through purchase and conservation easement private lands in the Reese Creek area (see "Bison: Land Acquisitions/Easements or Winter Range" in this volume for more information).

Representative Comment: 194E

I Comment: The final plan should include long-term separation, continued testing, and quarantine of pregnant seronegative bison rather than immediate slaughter.

Response: Alternative 4 analyzes a scenario very similar to this one. We agree that long-term separation of potentially infectious bison or their birth products from susceptible cattle would eliminate virtually all risk of transmission of the disease. Capture, test, and quarantine operations of seronegative animals are part of alternatives 3, 4, 7, and the modified preferred alternative, and quarantine of seronegative pregnant bison is specifically identified as part of alternative 4.

Representative Comment: 194E

Issue 3: ***Design, Location, Funding and Operation of a Facility***

A Comment: A quarantine facility should be a pasture-type facility.

Response: As noted in (volume 1, "The Alternative: Alternative 3 Quarantine"), the location and design of a quarantine facility would be analyzed in a future NEPA process, complete with public input and scrutiny. However, possible designs range from a small feedlot-type approach to a multiple pasture operation and would depend, to some degree, on the cost and availability of land.

Representative Comment: 6C

B Comment: A quarantine facility should be placed in various locations. Some commenters wanted it far from Yellowstone National Park, some within the Greater Yellowstone Area, some inside the park, some on tribal lands, some adjacent to the park, some away from critical wildlife habitat or migration routes, and some requested specifically not on Royal Teton Ranch land adjacent to the park.

Response: The location of the proposed bison quarantine facility has not yet been determined. The construction and operation of a quarantine facility on federal land or built with federal money would be subject to a NEPA impact analysis, complete with public involvement, before any decisions on location or design were made.

Representative Comment: 698D

C Comment: Commenters variously requested that animal health authorities, the InterTribal Bison Cooperative, or tribes operate a quarantine facility for bison. Humane treatment, adequate facilities, and adequate training were reasons given in support.

Response: A quarantine facility would be operated humanely. Bison would be given adequate food, water, and space. They would be housed so that aggressive animals were separated from calves, yearlings, or smaller adults. The bison quarantine protocol, which is part of the "Uniform Methods and Rules for Brucellosis Eradication," does not limit who may operate a quarantine facility. It only requires that the facility be approved and that it be operated in compliance with the procedures detailed in the protocol. The siting of the facility and who operates it would be decided in a subsequent NEPA process.

Representative Comment: 4433F

D Comment: How would the facility be funded?

Response: The facility would be funded with federal and/or state money. At this time, Congress has set aside $1 million for the construction of a bison quarantine facility, should it be part of the selected alternative.

Representative Comment: 14889E

Issue 4: ***New Alternatives***

A Comment: If bison numbers exceed capacity outside Yellowstone National Park, use limited hunting and pasture-type quarantine to relocate bison to tribal or public lands.

Response: The two options mentioned in the comment do not, by themselves, meet all of the environmental impact statement objectives or allow the agencies the options they need to meet these objectives. Hunting and quarantine may be sufficient when numbers of bison exceed capacity outside the park by relatively small numbers and when there is no danger of compromising the temporal and spatial separation of cattle and bison. However, when numbers of bison exiting the park are relatively large (such as when bison population size is sufficiently large, winters are sufficiently severe, or both), or when temporal and spatial separation cannot be ensured, these two actions alone will not be adequate.

Representative Comment: 1601A

B Comment: Quarantine the sick ones and try to find a cure.

Response: There is no feasible treatment or cure for animals, particularly wildlife, infected with *B. abortus*. This is primarily because the bacteria that causes brucellosis is intracellular (lives inside the cell), and therefore is not readily treated by antibiotics. None of the alternatives contemplate quarantining any bison testing serologically positive for exposure to brucellosis. In alternatives 3, 4, 7, and the modified preferred alternative, where quarantine is proposed, only some serologically negative bison would be considered for quarantine.

Representative Comment: 5187H

C Comment: Quarantine was not included in alternative 6. It would seem to be important in the control/elimination of *B. abortus*.

Response: The purposes of the bison quarantine facility are to give agencies the flexibility they do not now have in the disposition of seronegative bison, to provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients, and to minimize lethal control of bison that wander out of Yellowstone National Park. Its direct effect on control/elimination of *B. abortus* would be limited because the number of bison such a facility could hold would also be limited.

Under alternative 6, a quarantine facility would have limited usefulness compared to some of the other alternatives. During phase 1, bison on the west side would be captured and tested at Seven-Mile Bridge; the seronegatives would be released on site, so there would be virtually no reason to send any to quarantine. The practicality of having the Stephens Creek facility as the only source of seronegative bison for quarantine is questionable, particularly during winters such as 1997–98 and 1998–99 when no bison were captured in that facility. During phase 2 intensive test and slaughter inside the park would result in the seronegatives being released inside the park rather than sent to quarantine.

Representative Comment: 5672B

D Comment: Add quarantine facility to alternative 1.

Response: Alternative 1 is the no-action alternative (i.e., the current *Interim Bison Management Plan*) and does not include a quarantine facility. However, alternative 4 in the environmental impact statement is very similar to alternative 1 except for the addition of a quarantine facility and hunting. See volume 1, "The Alternatives: Alternative 4" for more information.

Representative Comment: 15543AI

E Comment: Quarantine all bison affected with brucellosis.

Response: All bison herds that are privately owned and affected with brucellosis are quarantined until the herd tests brucellosis free or is depopulated. However, free-roaming wildlife, such as those in Yellowstone National Park, have generally not been placed under quarantine. The official quarantine protocol for Greater Yellowstone Area bison, given in the "Uniform Methods and Rules for Brucellosis Eradication," provides a quarantine procedure for certifying individual bison from Yellowstone and Grand Teton National Parks as brucellosis free and therefore available for shipment to reservations and other appropriate locations. Only bison initially testing negative would enter quarantine, and any that test positive during quarantine would be sent to slaughter.

Representative Comment: 8785C

Issue 5: ***Necessity of a Quarantine Facility***

A Comment: A quarantine facility is unnecessary, but commenters did not elaborate or give reasons.

Response: The agencies have analyzed several alternatives with quarantine and several without. If quarantine is part of the final selected alternative, it would be because the agencies believe it can provide the following benefits: provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients, and minimize lethal control of bison that wander out of Yellowstone National Park. A quarantine facility would give agencies the flexibility they do not have in the disposition of seronegative bison. For example, under the terms of the current *Interim Bison Management Plan*, bison are prevented from crossing the northern park boundary at Reese Creek. All bison captured at the Stephens Creek facility are shipped to slaughter if they cannot be held until they can be hazed back into the park. The use of a quarantine facility would limit lethal control of these animals.

Representative Comment: 200C

B Comment: No quarantine would be needed if cattle were vaccinated.

Response: Most, if not all, cattle in the Greater Yellowstone Area are already vaccinated. The intent of the bison quarantine facility is to provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients and to minimize lethal control of bison that wander out of Yellowstone National Park.

Representative Comment: 2260AA

C Comment: The quarantine of seronegative bison and the slaughter of infected cattle is necessary to abolish brucellosis and to keep surrounding states at a brucellosis class-free status.

Response: Quarantining and retesting of seronegative bison, and slaughtering any newly disclosed brucellosis-affected cattle, are important tools in the prevention of the transmission of brucellosis. The prevention of the transmission of brucellosis to cattle in brucellosis class-free states can be critical in

maintaining the status of those states, however, abolishing brucellosis in wildlife is not a requirement for states to maintain their class-free status.

Representative Comment: 8745G

D Comment: A quarantine facility should only be used if population reduction becomes necessary.

Response: The primary intent of the bison quarantine facility is to provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients. However, quarantine can be an important nonlethal tool to help maintain the population at a particular size, such as in the modified preferred alternative.

Representative Comment: 194C

E Comment: As long as the bison are kept from contact with the cattle, states ought to be able to maintain their brucellosis class-free status without the cost/hassle of quarantine.

Response: The states are currently able to maintain their brucellosis status as long as brucellosis does not spread to livestock in the state. The purpose of the bison quarantine facility is to provide a mechanism for the release of certified brucellosis-free bison to Native American tribes, parks, preserves, or other appropriate recipients, and to minimize lethal control of bison that wander out of Yellowstone National Park.

Representative Comment: 3059G

Issue 6: ***Protocol Proposed for Bison***

A Comment: APHIS must develop and approve a more reasonable quarantine protocol, similar to its quarantine protocol for cattle. The bison quarantine protocol is inordinately restrictive and is more rigid than that used for cattle.

Response: The bison quarantine protocol was designed to account for the long incubation period that may occur in bison due to the fact that they reach sexual maturity later than domestic cattle do. It is intended to ensure that bison are indeed free of brucellosis when they are released from a quarantine facility.

Representative Comment: 9369H

B Comment: Few or no bison will make it through the quarantine alive. There is no assurance that bison will ever make it out alive.

Response: Only bison that initially test negative will be placed into quarantine facilities. It is anticipated that a number of these animals may be incubating the disease and may test positive at a later date. Bison placed into the quarantine facility will be divided into groups based on risk factors in order to minimize spread should an infected animal be disclosed. If quarantined bison are in small groups, and should one of them seroconvert, only a relatively small number of other bison would be affected (i.e., be required to start over). It should also maximize the number of bison that successfully complete the quarantine protocol.

Representative Comment: 823B

C Comment: Quarantining bison would increase the chance of brucellosis and other diseases being transmitted to quarantined bison.

Response: The procedure described above in issue 6B would also ensure that the fewest possible number of bison would be exposed to any bison in a group that did seroconvert. This design would minimize, rather than increase, the chance of brucellosis or other diseases being transmitted to quarantined bison.

Representative Comment: 1821C

D Comment: The bison should only be held until tested, and then released. The facility should also only be a short-term one and used only until bison have been transferred to Native Americans or other groups.

Response: If a quarantine facility is chosen as part of an alternative, it would be used for the life of the management plan. A quarantine facility would hold bison until testing under the official protocol indicates they are free of brucellosis infection. Due to the potentially lengthy incubation period of brucellosis, a single test does not ensure that an animal is free of disease. Therefore, it is necessary to quarantine and retest negative animals to ensure that they are not incubating the disease, which would result in the animals testing positive at a later date. The quarantine facility is a method of housing these animals through this testing period. Once bison were certified as being free of brucellosis, they would be released to Native American tribes, parks, preserves, or other appropriate recipients.

Representative Comment: 2120F

E Comment: The current quarantine plan is based on politics, not science. A more scientifically credible plan is needed.

Response: If the commenter is referring to quarantine protocol (quarantine "plan" is unclear), the bison quarantine protocol is based on science (i.e., on what is known about brucellosis in bison and about bison reproduction). It was designed to account for the long incubation period that may occur in bison due to the fact that they reach sexual maturity later than domestic cattle do. It also takes into account the fact that very little is known about the disease in males. It is intended to ensure that bison are indeed free of brucellosis when they were released from the quarantine facility.

Representative Comment: 9168A

F Comment: A comparison of this protocol to other quarantine protocols should be detailed in the environmental impact statement.

Response: The bison quarantine facility protocol is briefly outlined in appendix B of volume 1. The full protocol is detailed in the "Uniform Methods and Rules for Brucellosis Eradication." Quarantine and quarantine release requirements for cattle are also outlined in the uniform methods and rules. There are no other quarantine protocols for bison.

Representative Comment: 15420XX

G Comment: The "Citizens' Plan" makes light of the disease factor by stating that the quarantine protocol could easily be made much simpler. It advocates making the facility a pasture-type, neither inside Yellowstone National Park nor within an SMA. It does not discuss how such a facility might obtain federal or state approval, how it would be maintained sufficiently secure to protect adjacent areas from the risk of brucellosis transmission, or how it would be staffed and funded.

Response: While we cannot address or defend issues the "Citizens' Plan" advocates, we do note that several of the issues the commenters raise are relevant to the alternatives discussed in the environmental impact statement. For instance, the length of the quarantine protocol for wild bison is based on a relatively long incubation period for bison. Bison reach sexual maturity later than domestic cattle, and in females the disease may only show itself after the cow becomes pregnant. Also, little is known about the disease in male bison. Before APHIS can certify these bison as being free of brucellosis, a sufficient amount of time and testing is therefore required.

As to the location or design of the facility, this has not yet been decided and would be the subject of a future NEPA process. However, a pasture-type facility outside the park or beyond the SMAs is not considered outside the range of reasonable alternatives. If this or any other type of quarantine facility was eventually selected for implementation, permit approvals, staffing and funding would be part of the planning process, as it is for any federally funded facility. Sufficient security to protect adjacent areas would be an important part of facility design, and as noted in the final environmental impact statement (see volume 1, "The Alternatives: Alternative 3" — Quarantine" for more information), precautions to ensure security such as double or triple fencing contribute to the cost as well.

Representative Comment: 15316BB

Issue 7: ***Animals Selected for Quarantine***

A Comment: What does "removing 'surplus' blood test negative animals from the ecosystem" mean? (Define "surplus" or "excess" bison.) Removing these bison is unfounded because the majority of seronegative bison have either never been exposed to the bacteria, have been exposed and have completely cleared the bacteria and antibodies, or have a natural (genetic) resistance to infection. Such bison should be kept in the population.

Response: The agencies assume the commenter is referring to a quarantine proposal, which would be the destination of seronegative bison under several alternatives. In some alternatives, including the modified preferred alternative, such shipment would occur only when certain population levels were exceeded in the different areas where the agencies manage bison outside the park.

Research is currently underway on natural resistance in the Yellowstone bison herd. Studies on other bison herds indicate about 10% of those herds challenged with a potent, virulent dose of *B. abortus* appear to be naturally resistant to brucellosis (Joe Templeton, Texas A&M University, pers. comm.). It is true that these bison would likely test seronegative, but only the nonrandom removal of these bison would risk the elimination of disease resistant genes. In fact, most alternatives preferentially select seropositives for removal.

Representative Comment: 1226E

B Comment: Consider a quarantine facility for cattle as well as bison.

Response: Quarantine is an accepted practice for cattle if a herd has been determined to be affected (at least one individual is infected). In order to be released from quarantine, those herds are either depopulated (the whole herd is sent to slaughter), or they are maintained under quarantine and tested numerous times until it is determined that they are free of brucellosis. If any additional cattle are determined to be reactors during this quarantine period, the reactors are slaughtered and the testing of the remaining cattle in contact with the reactor(s) is begun again. However, no cattle in the Greater Yellowstone Area have brucellosis now (e.g., no cattle are affected). Rather, it is the bison who have been exposed and who require testing over a series of months before they can be definitively declared free of the disease.

Representative Comment: 2977F

Issue 8: ***Elk v. Bison Disease Management***

A Comment: It is useless to single out bison for quarantine or slaughter over elk, since elk also carry brucellosis and are a possible source of transmission to cattle.

Response: While it is true that both species in the Greater Yellowstone Area carry brucellosis, elk in the Montana portion of the Greater Yellowstone Area test seropositive at very low rates, approximately 1%–2% (NAS 1998). Elk also have behavioral differences that may minimize transmission to cattle. Please see

volume 1, "Purpose of and Need for Action: Background — Brucellosis in Other Wild Ungulates" for more information. Because of these factors, Montana officials believe that elk in the northern range do not present enough of a risk of transmission to warrant their management.

Representative Comment: 6704A

Issue 9: ***Quarantine on Tribal Lands***

A Comment: Bison on private lands should be trapped with a landowner's permission, tested for brucellosis, and transported to tribal lands. Even seropositive bison should be offered to reservations without quarantining them first.

Response: Seropositive bison, or even bison testing seronegative but who could be incubating the disease, are considered to pose too high a risk to be moved to private lands, zoos, or elsewhere. Currently, APHIS regulations (9 CFR 89, subpart C) generally do not allow brucellosis-exposed bison from the park to move to locations other than slaughtering facilities. The purpose of the quarantine protocol (see above) is to ensure bison testing seronegative are truly disease free before they are released. The agencies support the distribution of bison completing quarantine to Native American tribes, as well as to other public land areas, national park units, wildlife refuges, or approved research programs.

Representative Comment: 7365C

B Comment: Helping Native American tribes is not part of the stated purpose of the environmental impact statement. Even if it was, providing postquarantine bison will not help Native American tribes because only an average of 50 bison a year would go into quarantine.

Response: The primary intent of the bison quarantine facility in the alternatives that include it is to provide the agencies the flexibility of nonlethal control of seronegative bison leaving the park. Because these bison may spend up to several years under quarantine to ensure that they are brucellosis free, they would no longer be considered wild upon release, and so would be available to requesting agencies or organizations. Several tribes have indicated a desire for these bison; the agencies believe distribution to the tribes and to public parks or public lands would be appropriate. At this time, it is difficult to predict how many bison would enter or leave a quarantine facility because there are no designs to review, and the seroconversion rate in the Yellowstone bison herd is still under study. Since these important factors are unknown, the agencies can only say that the commenter may be correct in that only 50 bison would be declared brucellosis free in a given year for a single quarantine facility. If the quarantine concept is proven over time, enlarging the existing facility or building another, with appropriate NEPA planning and public input, might be considered. Regardless, it is important to point out that even 50 bison can begin populating what will become much larger herds over time, spreading the genetic material of the original population of bison in the U.S. over a much larger section of the country. Although this is not a goal of taking action to manage bison, it is a significant benefit that would derive from including a quarantine facility as part of the selected bison management plan.

Representative Comment: 10682K

Issue 10: ***Distribution of Live Bison***

A Comment: What happens if no state will accept bison from the facility?

Response: Bison released from quarantine would be free of brucellosis; therefore, no state restrictions are anticipated. Also, many tribal governments, which operate outside and independent of state restrictions, have indicated interest in receiving these bison.

Representative Comment: 14889E

Ranching (BI-16)

Issue 1: ***Issues Related to Bison Ranching***

A Comment: Set up feeding stations throughout the park to prevent bison from moving out of the park.

Response: Supplemental feeding of wildlife is considered to be a poor management practice, and it increases the risk of disease transmission. This issue is addressed in volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Alternatives Suggested but Not Analyzed."

Representative Comment: 120C, 14852D

B Comment: Native wildlife should not be domesticated by farming.

Response: Although from 1907 to 1952, a herd of bison was managed at the Lamar buffalo ranch using cattle ranching techniques, in 1966 the National Park Service policy shifted to emphasize natural regulation of wildlife populations. Current policy relies on natural processes to control native animal populations to the greatest extent possible (*NPS-77: Natural Resources Management Guideline,* ch. 2, p. 21).

Representative Comment: 3184G

C Comment: Instead of ranching cattle, ranchers in the area should raise bison.

Response: The agencies have no legal basis to require livestock owners to modify their operations or to raise bison instead of cattle.

Representative Comment: 1871C

D Comment: Grazing allotments on federal lands should be given to ranchers who will raise bison, not cattle.

Response: The presence of ranched bison on grazing allotments on public land would likely not alleviate the concern over the potential transmission of brucellosis as domestic bison are considered livestock and management issues and concerns would be similar to those for domestic cattle.

Representative Comment: 14379F

E Comment: It was suggested that the agencies should isolate and breed bison that are naturally immune to brucellosis.

Response: Manipulating the wild and free-ranging bison population to this extent is currently not possible and would violate natural regulation policies of the National Park Service.

Representative Comment: 5668B

F Comment: When the Yellowstone National Park bison population gets to the point that bison leave the park they should be sold to private bison ranches.

Response: Because this herd is affected with brucellosis, APHIS would require bison from the park to go through a quarantine process before they could be relocated. The protocol for quarantine is addressed in, volume 1, "Appendix B: Quarantine Protocol for "Bison"; responses to similar comments can be found in this volume in sections "Bison: Quarantine," and Bison: Distribution (Live)." At this time, the preference of the agencies is to release bison that pass quarantine to Native American tribes, parks, preserves, or

other appropriate recipients, although priority for recipients would be further fleshed out in a tiered and separate NEPA planning process for quarantine.

Representative Comment: 5202B

Special Management Areas (BI-17)

Issue 1: ***A Large Special Management Area as Described in the Citizens' Plan***

A Comment: Many comments support the "Citizens' Plan," which creates a large special management area for bison on public lands where bison can survive harsh winters and are managed by wildlife professionals.

Response: The use of areas outside the park by bison is a feature of all alternatives except for alternative 5. These areas are called special management areas, and are defined as "an area contiguous to the park where some or all bison may be tolerated for part or all of the year, as specified in the selected alternative without increasing the risk of brucellosis transmission to domestic livestock," (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area").

The areas that would be designated as special management areas are identified on maps in the description of each alternative. The modified preferred alternative uses an adaptive management approach in a series of phases to describe management actions that would occur in the management areas, and within the management areas a series of management zones would be the principal risk management method to maintain temporal and spatial separation between bison and cattle. These management zones would employ a decreased tolerance for bison as they moved farther from the Yellowstone National Park boundary and approached the limits of the management areas, similar to the concepts and prescriptions outlined in the "Citizens' Plan."

Representative Comment: Form 1B

B Comment: Comments support the "Citizens' Plan" and favor a large SMA created for bison on public lands where bison would be allowed to roam without being killed by government agents.

Response: Except for alternative 5, all alternatives contemplate some tolerance for some classes of bison on public lands outside Yellowstone National Park. Some alternatives, such as alternative 2, emphasize non-lethal methods of bison management and include hazing as a management activity to control bison distribution. However, no alternative rules out the use of lethal methods, such as shooting or slaughter, to control bison population of distribution within an SMA. One of the nine objectives the agencies used to determine the reasonableness of an alternative included defining a boundary beyond which bison would not be tolerated (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," Objective 2). Bison are large, dangerous wildlife, and precluding use of lethal control might not allow agencies to meet this objective or others. An additional alternative, "Allow bison to exist without human influence," was considered and rejected as unreasonable because it did not meet several of the objectives the agencies agreed were necessary in developing a bison management plan.

Representative Comment: Form 10C

C Comment: SMAs in the "Citizens' Plan" do not account for the fact that areas within the SMAs are not likely to be used by bison and are not biologically or politically suitable for bison.

Response: Contact the authors of the "Citizens' Plan" for their explanation of SMAs. For purposes of the environmental impact statement, however, the agencies have identified and illustrated that SMAs are administratively complex and that some areas outside Yellowstone National Park are more likely than others to support bison (see the alternative 2 map). Based on (1) past bison movements and distribution, (2) agency experience regarding human land use, terrain, snow depth, forage type and availability, and (3) bison use of the habitat, agency biologists and managers recognized that bison would unlikely inhabit most of the area within an SMA, particularly during winter. The brown stippled areas on the alternative maps were intended to illustrate those areas where the agencies believed bison would likely be found during winter. The stippled areas do not imply that individual bison could not inhabit other areas within a

particular SMA. Stochastic events such as winter severity, snow depth, and access to forage and other periodic events are known to be important influences on bison migration. These conditions mean predicting the number of bison and the distribution of bison movement in any given year is impossible. Potential bison movement to public and private lands in the Reese Creek and Eagle Creek/Bear Creek areas was identified, as well as a limited number of bison potentially moving into the Hellroaring and Slough Creek areas north of the park in the Absaroka-Beartooth Wilderness. A few individual bison and small groups may use public lands contiguous with the northwestern boundary of Yellowstone National Park in the Lee Metcalf Wilderness and Cabin Creek Recreation and Wildlife Management Area (see volume 1, "Purpose of and Need for Action: Background — Bison Distribution").

Representative Comment: 15316BB

Issue 2: ***Private Lands for SMAs***

A Comment: Supplement or enlarge SMAs for bison range, particularly winter range, by acquiring of private lands from willing sellers or condemnation.

Response: Alternatives 2, 3, 7, and the modified preferred alternative provide for agencies to pursue the purchase of property or conservation easements from willing sellers for bison winter range and other bison management purposes and activities. The agencies do not believe condemnation of private lands is a necessary or publicly acceptable management approach for bison management. All proposed transactions are on a willing-seller basis. Alternative 2 describes the largest SMA of all alternatives and contains a more extensive program of land acquisition, purchase of conservation easements, compensation to livestock owners for changes in their operations, and modifications in public grazing allotments. Alternative 7 contains land acquisition or easements from willing sellers north of Yellowstone National Park in the Reese Creek area, but it does not propose the purchase of lands or changes in livestock operations for the western boundary area. The modified preferred alternative identifies acquisition through purchase or easements of additional winter range north of the park boundary at Reese Creek, west of the Yellowstone River. It also contemplates the acquisition of grazing rights and the subsequent absence of cattle between Reese Creek and Yankee Jim Canyon and the tolerance of a limited number of bison on conservation easements and private lands based on willing-seller negotiations with the landowner. Since the *Draft Environmental Impact Statement* was completed, approximately 6,131 acres in the impact area have been acquired through purchase or easement on lands north of the park's Reese Creek boundary. Discussion and negotiations on additional acquisitions through land exchange are ongoing.

Representative Comment: 10005E, 8984B, 7554C, 7981A, 5221I, 11409A

B Comment: SMAs and the purchase of private lands would minimize the risk of disease transmission until a safe and effective vaccine for bison was found.

Response: The commenter is correct that the purchase of lands and the creation of SMAs would help facilitate spatial separation, a feature that is integral to risk management in nearly every alternative.

Representative Comment: 1063E

Issue 3: ***Excluding Private Lands from SMAs***

A Comment: Because of the abundance of private lands north of Duck Creek, they should be excluded from SMAs.

Response: For all alternatives, except alternative 5, an SMA is defined as an "area contiguous to the park where some or all bison may be tolerated for part or all of the year" Within an SMA some landowners may or may not want bison on their private property, and under Montana law the Montana Department of Livestock can remove bison from private land pursuant to a landowner's request and permission. If the

Department of Livestock cannot respond to a landowner's request to remove bison, the landowner may shoot the bison (see "The Alternatives: Actions Common to All Alternatives — Private Land").

Representative Comment: 15718A

B Comment: Acquisition of private land north of Yellowstone National Park is expensive and time consuming.

Response: Alternatives 2, 3, 7, and the modified preferred alternative provide for agencies to purchase private lands north of the park boundary from willing sellers (see response above to issue 2A). Currently officials from the U.S. Department of the Interior, the U.S. Department of Agriculture the Forest Service), and the Rocky Mountain Elk Foundation (a private organization) have worked with Royal Teton Ranch to purchase lands and conservation easements north of the park boundary. The final purchase of lands and conservation easements was completed August 31, 1999, at a total price of approximately $13.5 million. The modified preferred alternative identifies acquisition through purchase or easements of additional winter range north of the park boundary at Reese Creek, west of the Yellowstone River. It also contemplates the acquisition of grazing rights and the subsequent absence of cattle between Reese Creek and Yankee Jim Canyon and the tolerance of a limited number of bison on conservation easements and private lands based on willing seller negotiations with the landowner. Since the *Draft Environmental Impact Statement* was completed, approximately 6,131 acres in the impact area have been acquired through purchase or easement on lands north of the park's Reese Creek boundary. Discussion and negotiations on additional acquisitions through land exchange are ongoing.

Representative Comment: 100115C

Issue 4: ***The Legality of Special Management Areas***

A Comment: The SMAs are not legal under existing law, and the SMAs would enlarge Yellowstone National Park.

Response: The SMAs are part of seven of the alternatives presented in the final environmental impact statement, including the modified preferred alternative. In general, SMAs define an area outside Yellowstone National Park where various management activities could take place. Among other requirements, each alternative analyzed "complied with legal or regulatory mandates" of each agency (see "The Alternatives: Introduction"). APHIS has determined "that no changes in the current requirements for obtaining class-free status (9 CFR 78) would be required for the agencies to establish SMAs." The state of Montana has also indicated that pursuant to statutory and regulatory requirements "the establishment, modification, or revision of SMAs requires the approval of the state of Montana as specified by Montana law" (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area"). As stated in other responses, although management alternatives provide for the possible acquisition of easements or property from willing sellers, Yellowstone National Park has no plans to expand park boundaries (see "Purpose of and Need for Action: Objective and Constraints — Objectives in Taking Action," last paragraph).

Representative Comment: 17856D

B Comment: Alternative 2 is illegal because the SMA boundary along the Montana-Idaho border directly impacts the state of Idaho and the Idaho state agency responsible for policing this boundary, and it exposes large numbers of Idaho cattle to bison.

Response: The brown stippled areas on the Alternative 2 map were intended to illustrate those areas where the agencies believed bison would likely be found during winter. As noted, many of the boundaries are along geographic barriers or are inaccessible because of unfavorable terrain, deep snow, or unavailability of forage. The area identified in alternative 2 indicates that it is unlikely that bison would inhabit areas along the Montana-Idaho border. In addition, because of the steep, forested terrain and deep

snows, the agencies believe few if any bison would occupy areas near the Montana-Idaho border. If an occasional bison approached the Montana-Idaho border, the agencies would use monitoring and hazing, if those actions were unsuccessful, shooting would be used to control and prevent bison movement from Montana into Idaho. The agencies do not believe that large numbers of cattle are grazed along the Montana-Idaho border during winter.

Representative Comment: 11121E

C Comment: The assumption that the Montana state veterinarian will allow untested exposed or possibly infected bison into SMAs within Montana is contrary to Montana laws and rules requiring the state veterinarian to take action against such bison.

Response: All alternatives allow for various types of management of bison that may enter into Montana and feature different levels of "hands-on" management. In addition, the final preferred alternative and records of decision of the cooperating agencies will comply with regulatory and statutory requirements of all the agencies. The various alternatives present a range of alternative management approaches that range from no tolerance of any bison outside of the park to tolerance of untested bison. The modified preferred alternative proposes an adaptive management approach in a series of steps first testing management capability in the management areas with seronegative bison and moving to tolerance of limited numbers of untested bison. The modified preferred alternative addresses risk management through spatial and temporal separation of bison and cattle and would allow limited numbers of untested bison in specifically described areas under specific management prescriptions. Montana statutes provide that the state veterinarian may take action on bison from a herd that has a disease which can be transmitted to people or livestock under a plan approved by the governor. The Montana state veterinarian and the state of Montana have considerable discretion in developing a management program and implementing management actions. For example, untested bison are permitted in the Eagle Creek/Bear Creek area north of the park under most alternatives. The mere presence of untested bison does not require Montana to remove those animals.

Representative Comment: 9364U

Issue 5: ***The SMAs as a Way to Add Lands to Yellowstone National Park***

A Comment: SMAs are a land acquisition plan of the National Park Service. They represent a de-facto increase in the size of Yellowstone National Park and increase the risk of brucellosis transmission to cattle by moving the border of the park closer to cattle populations in Montana and Idaho.

Response: For the purposes of the management plan, SMAs are defined as areas "contiguous to the park where some or all bison may be tolerated for part or all of the year, as specified in the selected alternative, without increasing the risk of brucellosis transmission to domestic livestock" (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area"). Although some alternatives provide for the possible acquisition of easements or property from willing sellers, Yellowstone National Park has no plans to expand park boundaries (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," last paragraph). Rather, these lands would be managed by the U.S. Forest Service. None of the alternatives moves the boundaries of the park.

Representative Comment: 11057F, 14305J, 9686B

Issue 6: ***Authority for the Management of Bison within SMAs***

A Comment: Montana or the Montana state veterinarian should have the authority to remove, tolerate, or return bison to the park and revoke or modify SMAs. Others stated that neither the Montana state veterinarian nor the Department of Livestock should have the authority for bison management within SMAs.

Response: All alternatives analyzed comply with regulatory and statutory requirements of all the agencies. In addition, pursuant to the final preferred alternative and record of decision, management authorities and actions will comply with the regulatory and statutory requirements of the cooperating agencies. The agencies have recognized that all management alternatives require the cooperation of all agencies, as all have jurisdiction over a portion of the management efforts, either directly or indirectly. In all alternatives where SMAs are identified, nearly all management actions within the SMAs are under the management discretion of Montana and the U.S. Forest Service.

Representative Comment: 15246D, 14836G, 14932D, 14436B, 8375C

Issue 7: ***SMAs Do Not Contribute to the Resolution of Management Issues***

A Comment: SMAs, and more specifically those in alternatives 2, 3, and 7, do not address the brucellosis problem and would make the problem worse because of larger grazing areas and bigger infected herds.

Response: All alternatives "address the brucellosis problem" and ensure the objectives, including #5, "protect livestock from the risk of brucellosis," are met. This is true for alternatives 2, 3 and 7 as well. In each of these alternatives, bison are kept separate from susceptible cattle, either by managing bison to return to the park well before cattle arrive in the summer to graze, or by removing susceptible cattle from the impact area. In addition, the agencies do not believe SMAs provide significantly more grazing area (17,000 acres compared to the 2 plus million in Yellowstone National Park already available to them; [see responses to comments regarding "Bison: Land Acquisitions" in this volume for more information]). For most alternatives (all except alternative 2), bison grazing is limited to winter months. The alternatives do not provide significantly more additional grazing areas for bison within the SMAs. For most alternatives (all except alternative 2), bison grazing is limited to winter months when cattle are not present on private or public lands. As described above in issue 1C, a small area within an SMA (identified as brown stippled areas on alternative maps) is suitable for bison, particularly during winter.

Representative Comment: 14841C, 14878D, 14305J, 15175a

B Comment: The need for action suggests additional ranges for bison are needed because Yellowstone National Park is not a complete ecosystem. SMAs do not contribute to a complete ecosystem for Yellowstone National Park.

Response: Although we agree SMAs do not complete the ecosystem, we disagree they do not contribute to the completion of the ecosystem. The need for action in the *Draft Environmental Impact Statement* did not suggest that SMAs would complete the Yellowstone ecosystem, but it did describe the importance of bison to the area and did note that periodic bison movements into Montana were natural events. SMAs would not be created with the intent of providing a complete ecosystem for Yellowstone National Park. For the purposes of this management plan, an SMA "is an area contiguous to the park where some of all bison may be tolerated for part or all of the year, as specified in the selected alternative without increasing the risk of brucellosis transmission to domestic livestock" (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area.")

Representative Comment: 9364P

C Comment: Citing the NAS report, some commenters said allowing bison use outside Yellowstone National Park would spread the disease threat over a much larger area.

Response: For the purposes of the management plan, SMAs are defined as areas outside the park where some bison may be tolerated for part or all of the year without increasing the risk of brucellosis transmission to domestic livestock. (See response above in issue 2B and "The Alternatives: Actions Common to All Alternatives — Special Management Area.") Therefore, they would not spread the disease threat.

Representative Comment: 14338B

D Comment: The western SMA is dysfunctional from a disease control standpoint because of the interference of activists, the enforcement of the Endangered Species Act, and the inability to test all bison entering the SMA due to logistics, trap location, and security.

Response: For all management alternatives with SMAs, the western SMA is an area where some or all bison could be tolerated outside Yellowstone National Park boundaries for all or part of the year. Within an SMA several management activities are contemplated to manage for and reduce the risk of transmission, depending on the alternative. Although some individuals have attempted to interfere with management activities conducted as part of the *Interim Bison Management Plan*, the agencies were able to conduct all necessary bison management activities, including hazing, capturing, testing, slaughtering, and shooting bison in the field when necessary. All federal agencies are required to consider the potential effects of their actions on species listed as threatened or endangered. Federal agencies are to assess the effects of their proposed actions on threatened or endangered species and critical habitat for these species, write biological assessments for the proposed actions, and consult with the U.S. Fish and Wildlife Service if any effect is anticipated (see volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species — Summary of Regulations"). For those alternatives where capture and testing of bison are necessary, hazing or shooting could be conducted to accomplish management objectives. Alternatives contemplating a capture facility on public land in the western boundary area also provide for relocation "to take advantage of changing bison migration routes" (see alternatives 1, 4, and 7).

Representative Comment: 10638P

Issue 8: ***SMAs Contribute to the Resolution of Management Issues***

A Comment: APHIS regulations set up a situation where if a bison walks out of Yellowstone National Park, Montana can lose its brucellosis class-free status and affect ranchers distant from the park. SMAs are a good way to address this situation.

Response: The migration of bison from the park into Montana will not cause Montana to be downgraded from a class-free state. The Brucellosis Eradication Program, which confers state status, applies only to domestic cattle and domestic bison, not wild, free-roaming bison. As long as Montana met the requirements for brucellosis class-free status, it would maintain such status. For more information, see "Cattle: Brucellosis Class-Free Status" in this volume.

Representative Comment: 14379J

Issue 9: ***Management Programs or Actions within SMAs***

A Comment: Federal leases [grazing] could be traded for other leases where bison do not roam.

Response: Generally, other public grazing allotments are not available. See "Livestock Operations: Public Grazing Allotments — Modify" in this volume for more information.

Representative Comment: 5123C

B Comment: Do not take current public grazing to form special management areas.

Response: See "Livestock Operations: Public Grazing Allotments — Modify" in this volume for more information.

Representative Comment: 14887G

C Comment: As bison numbers reach the maximum limit for public lands outside Yellowstone National Park, they must be managed within SMAs with techniques including transfer of live bison to tribes and a regulated harvest not using government agency officials.

Response: Bison completing quarantine would be available for transfer to tribes and public lands or to other appropriate recipients if quarantine is part of the alternative selected. It is part of alternatives 3, 4, 7, and the modified preferred alternative. Hunting, or regulated harvest, was also evaluated as a management tool in two alternatives (3 and 4).

Representative Comment: 14484H

D Comment: Management in SMAs should be ecologically based, and habitat range condition parameters should be developed to establish population management goals within SMAs.

Response: For alternatives having SMAs bison numbers allowed in SMAs are tolerance levels within which movements beyond the specified areas would be unlikely and the risk management elements could be logistically implemented. Tolerance levels for bison were not based on forage carrying-capacity limits but were working limits to address logistical feasibility, risk management, and risk to private property elements. For more information on forage carrying-capacity estimates in the SMAs see "Bison: Land Acquisitions/Easements or Winter Range," issue 3E in this volume.

Representative Comment: 14309I

E Comment: SMAs should be adequate to handle migrating bison and severe winters. These SMAs should be fenced to contain the bison.

Response: This issue is similar to an alternative suggested but not analyzed, "Fence the Perimeter of Yellowstone National Park," to physically prevent bison from migrating beyond park boundaries. Significant fencing along borders like SMAs would have major impacts on movements of other wildlife such as pronghorn, bighorn, or elk. The consequences of large fences are inconsistent with both state and federal wildlife management policies, and fences tend to create a zoo-like atmosphere contrary to several agencies' wildlife management policies. Bison-proof fences would also be expensive to purchase, install, and maintain. Fencing the park or large boundary areas like SMAs is not evaluated further, but limited site-specific fencing is retained as a management option.

Representative Comment: 10348E

F Comment: In the winter of 1996–97, the National Park Service failed to capture all bison leaving the Stephens Creek SMA and failed to ship all seronegative bison to slaughter.

Response: Under the *Draft Management Interim Plan* in 1996–97 and plan adjustments implemented beginning in winter 1997, no SMA at Stephens Creek was established, as efforts were made to capture all bison exiting Yellowstone National Park along the Reese Creek boundary. Bison that were not captured could be hazed back into the park or shot. Some bison were not captured in winter 1996–97, and when hazing was not allowed or unsuccessful, state and federal personnel shot bison in the field. Under the 1996–97 *Interim Bison Management Plan*, contingency measures to hold seronegative bison were implemented, and the National Park Service elected to hold seronegative bison for release when winter weather conditions moderated to reduce the number of bison killed that winter. The adjusted plan developed in 1997 provides for three main actions, (1) hazing, (2) then capture, testing, sending only seropositives to slaughter, holding seronegatives, and (3) if capture and hazing were unsuccessful, agency shooting to prevent bison movement onto private land immediately adjacent and north of the park. The objective of adjustments was to reduce management removals and to provide for a stable bison population.

Representative Comment: 10638P

G Comment: Use a public plot of land as a safe zone that allows bison to roam and eliminates problems for ranchers.

Response: For public lands outside of Yellowstone National Park, the Eagle Creek/Bear Creek area is identified in alternatives 1 and 6 as public land where bison would most likely be found and where they could freely range with minimal agency management. Although less likely, free-ranging bison would be allowed in the Hellroaring and Slough Creek drainages in the Absaroka-Beartooth Wilderness north of the park and the Cabin Creek Wildlife Recreation and Wildlife Management area and the Monument Mountain unit of the Lee Metcalf Wilderness located west of the park. In phase 1 of alternative 2 the Eagle Creek/Bear Creek area is also identified as an area where bison could freely roam with no agency management (the same as alternative 1 above). In phase 2 of alternative 2 and after easement or acquisition of additional lands from willing sellers and appropriate changes in cattle operations, bison would be allowed to range freely without restriction, with minimal agency management, on public lands over the largest area of any alternatives (see alternative 2 map).

Representative Comment: 8611C

Issue 10: ***Acceptability or Appropriateness of SMAs***

A Comment: SMAs and low-risk bison would increase the risk of transmission and be unacceptable to animal health authorities.

Response: Many different individuals and organizations commented on SMAs. Of 7,221 comments on SMAs, approximately 80% supported the formation of SMAs and 20% were opposed. SMAs were identified as a component of alternatives 2, 3, 4, 6, and 7 and were not identified in alternatives 1 and 5. Each of the alternatives presented in the environmental impact statement, including management components such as SMAs, fulfills the purpose and need of the plan, satisfies objectives of the plan, and complies with legal and policy mandates of each agency. Also see responses to issue 6A and issue 6C above.

Representative Comment: 11531B

B Comment: SMAs do not contribute to a free-ranging bison herd, and containing bison in SMAs is a livestock practice, not a wildlife management practice.

Response: In the "Purpose of and Need for Action," the agencies recognized that bison periodically crossed administrative boundaries and that those bison movements were natural events, much as such movements are for other wildlife. The agencies have defined a free-ranging bison population as "one that is not routinely handled by humans and can move without restrictions within specific geographic areas" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action"). For those alternatives having SMAs, the agencies do not contemplate routinely handling bison, and the bison are allowed to freely range on public lands within the SMAs. In addition, all alternatives needed to satisfy objective 2, which is to "clearly define a boundary line beyond which bison will not be tolerated." In each alternative the agencies identified where and under what conditions bison would be managed on lands outside the park and within an SMA. For those bison that move beyond the identified boundary of an SMA, the agencies would haze bison back into the SMA, or if hazing was unsuccessful, the bison may be shot.

Representative Comment: 13096C

C Comment: SMAs are not scientifically valid and should be discarded.

Response: In developing the "Purpose of and Need for Action" in the environmental impact statement, the agencies recognized that bison are an essential component of Yellowstone National Park and the Gallatin National Forest. In addition, they indicated in the *Draft Environmental Impact Statement* that the

park is not a self-contained ecosystem for bison, and that periodic migrations into Montana are natural events. In agreeing to these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in the final bison management plan, to use some lands outside the park boundary. Therefore, management zones are proposed in many alternatives, including the modified preferred alternative. These zones allow agencies to manage bison using tools unavailable inside the park, and serve as "buffer zones" as described in the NAS report (1998), in which management actions can "facilitate the transition between goals of two contrasting land uses," in this case the park and surrounding agricultural land. The agencies believe that SMAs are scientifically valid and a useful management tool.

Representative Comment: 14431C

D Comment: Buffalo migration routes must be acquired and preserved as SMAs

Response: Several alternatives propose the acquisition of additional lands primarily for winter range of bison. No alternative specifically identifies migration corridors as important to bison movement to winter range but focuses on important winter range adjacent to Yellowstone National Park. The Eagle Creek/Bear Creek area provides for an area where any bison may travel and freely range on public lands.

Representative Comment: 14436B

E Comment: Elk are not limited to SMAs, and bison should not be limited to SMAs, either.

Response: It is true elk are not limited to SMAs. However, the low seroprevalence rate of the northern Greater Yellowstone Area elk herds (1%–2%), in spite of occasional seasonal concentrations that result in densities similar to those found on winter feeding grounds, suggests that the risk of transmission from northern Greater Yellowstone Area elk to cattle is lower than that from bison (NAS 1998). (See "Wildlife: Brucellosis in Other Wild Ungulates," and "Brucellosis: Transmission and Public Perception" in this volume for more information.)

Representative Comment: 10682N

F Comment: Acquisition of grazing rights, easements, or property is unacceptable to Idaho ranching families because the NAS report says the bison populations will increase and shift the boundary to a new point — private lands — where greater numbers of bison will have to be dealt with.

Response: This would only be true if bison were allowed to migrate wherever they desired. If the bison population was never hazed back into the park in the spring, and allowed to increase indefinitely with no boundaries, it would eventually spill out onto private lands, including perhaps some of those in Idaho. However, each alternative in the environmental impact statement includes provisions to address bison population size and define a boundary line beyond which bison are hazed or shot.

Representative Comment: 11160D

Issue 11: ***Bison Use of Public Lands outside Yellowstone National Park***

A Comment: The need for action portrays the illusion that portions of the Gallatin National Forest have already been put aside for bison, but much of the Gallatin National Forest remains an area of multiple use.

Response: Please see "Livestock Operations: Public Grazing Allotments — Livestock Operations Public Grazing Allotments — Modify" in this volume.

Representative Comment: 9364P

B Comment: Allow bison to roam on public lands adjacent to national parks commensurate with the carrying of capacity the public lands.

Response: Please see "Bison: Land Acquisition/Easements or Winter Range" in this volume.

Representative Comment: 1081A

C Comment: Bison should have use of U.S. Forest Service and Bureau of Land Management lands, particularly in winter.

Response: Please see "Livestock Operations: Public Grazing Allotments — Modify" in this volume.

Representative Comment: 296E, 397B

Special Management Areas — Authority to Manage (BI-18)

Issue 1: ***State Veterinarian's Authority for SMAs***

A Comment: Allowing bison on public lands within the SMAs cannot and must not be subject to the daily whims and arbitrary discretion of the Montana state veterinarian.

Response: All of the alternatives, except alternative 5, envision the establishment of SMAs or management zones for the modified preferred alternative. SMAs would be managed as areas adjacent to the park that bison could occupy without increasing the risk of brucellosis transmission from bison to cattle. Some discretion is required for the successful operation of SMAs because many of the factors that affect the risk of transmission are situation-specific and cannot be anticipated with certainty. The environmental impact statement defers some decisions regarding management within SMAs to the discretion of the Montana state veterinarian because the SMAs would be located in areas where the Montana Department of Livestock has primary authority for animal disease control.

Representative Comment: 3363G

B Comment: SMAs would effectively expand the boundaries of the park and increase the risk of disease transmission. For SMAs to be acceptable, the Montana state veterinarian must have the authority to revoke an SMA or change the time lines in response to threats from APHIS or other states to remove Montana's class-free status.

Response: SMAs provide a place for bison management in areas adjacent to the park where bison may be tolerated without increased risk of brucellosis transmission from bison to cattle. The record of decision will specify SMA boundaries and management frameworks that are consistent with these purposes. The state veterinarian will retain discretion within that framework.

Representative Comment: 14886H

C Comment: The United States Environmental Protection Agency understands that the establishment of SMAs would be at the discretion of the Montana Board of Livestock.

Response: This interpretation is not correct. The decisions to establish SMAs and to adopt management frameworks appropriate for each SMA would be made by all of the agencies and those decisions would be documented in the record of decision. Flexibility in the operation of SMAs is essential to successfully accomplish the purpose and need for this environmental impact statement. Therefore, the Montana state veterinarian would be authorized to exercise some discretion, but only within the framework defined by the record of decision.

Representative Comment: 14356K

Special Management Areas — Proposed Boundaries (BI-19)

Issue 1: ***Proposed Boundaries for Special Management Areas***

A Comment: SMA boundaries in alternative 2 are the minimum boundaries required to sustain a free-ranging natural bison herd.

Response: The agencies have indicated by analyzing eight alternatives that any of these alternatives would meet the purpose of taking action, which includes the maintenance of a wild and free-ranging herd of bison. This is one of the features each alternative must have to be considered reasonable.

Representative Comment: 13060E

B Comment: Eliminate the West Yellowstone SMA and reduce the proposed SMA north of Yellowstone National Park to the Little Trail Creek/Eagle Creek area.

Response: The SMA boundaries for the Eagle Creek/Bear Creek area described in the no-action alternative (alternative 1) would be similar to the boundary changes suggested in this comment. Impacts to the bison population and bison distribution would be similar to that described for alternative 1 except that more bison would be killed as a result of agency management action and no bison would be allowed at any time in the western boundary area outside of the park. For this proposed boundary change and assuming the agencies removed those bison that were predicted in alternative 1 to remain on public land outside the park in the western boundary (see the DEIS, table 30, column heading "Remaining on Public Land Outside YNP at West"), removals in the west boundary area would be about double that predicted for alternative 1.

Representative Comment: 9364QQ

C Comment: Expand Yellowstone National Park to include bordering public lands. Use ecosystem boundaries, not artificial park boundaries, as a goal, and buy all available land to augment Yellowstone National Park boundaries. Utilize a public fund drive or National Park Service funds to purchase additional lands.

Response: Expanding park boundaries would require congressional legislation and, as stated in the final environmental impact statement, Yellowstone National Park has no plans to expand park boundaries" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action."

However, several alternatives propose the creation of SMAs, and alternatives 2, 3, 7, and the modified preferred alternative propose acquisition through purchase of additional lands or easements from willing sellers. The agencies did agree that public entities could participate in acquiring grazing rights, easements, or property from willing sellers. Currently officials from the U.S. Department of the Interior, the U.S. Forest Service, and the Rocky Mountain Elk Foundation (a private organization) have worked with Royal Teton Ranch to purchase lands and conservation easements north of the park boundary. Final purchase of lands and conservation easements was completed August 31, 1999, at a total price of approximately $13.5 million. Since the Draft Environmental Impact Statement was completed, approximately 6,131 acres in the impact area have been acquired through purchase or easement on lands north of the park's Reese Creek boundary. Discussion and negotiations on additional acquisitions through land exchange are ongoing. The modified preferred alternative identifies acquisition through purchase of easements on additional winter range north of the park boundary at Reese Creek, west of the Yellowstone River. It also contemplates the acquisition of grazing rights and the subsequent absence of cattle between Reese Creek and Yankee Jim Canyon and tolerance of a limited number of bison on conservation easements and private lands, based on willing-seller negotiations with the landowner.

Representative Comment: 8688H, 8593B

D Comment: Create a 10-mile buffer zone around Yellowstone National Park to provide safe grazing for buffalo and elk.

Response: Currently, elk are allowed to freely range and graze on public lands within and outside Yellowstone boundaries at all times of the year. In many instances elk also periodically range on private lands throughout the Greater Yellowstone ecosystem. As such, this final environmental impact statement does not address the need for buffer zones for elk grazing.

Alternative 2 provides for an SMA that approximates a 10-mile buffer zone around Yellowstone National Park. In alternative 2, bison are allowed to freely range and graze throughout the SMA, with minimal agency management (see the alternative 2 map).

Representative Comment: 8818A

E Comment: Respondent demonstrated that the "Citizens' Plan" was consistent with the NAS report on brucellosis in the Greater Yellowstone Area regarding the establishment of perimeter zones in which animal populations nearest the Greater Yellowstone Area would have increased disease surveillance, monitoring, vaccination, and contact reporting programs. The NAS report (1998) also described buffer zones linked with perimeter zones to facilitate transition between contrasting management objectives.

Response: The concept of increasingly stringent monitoring and management of bison as they migrate farther from the park is integral to the modified preferred alternative. Also, SMAs in most alternatives function as a buffer zone between ranching operations and the bison herd

Representative Comment: 14819XX

F Comment: Additional SMAs might include habitat on the Gallatin River, where bison can occupy public lands without conflicting with cattle.

Response: Currently, alternative 2 provides for bison use of habitat along the Gallatin River to the Buffalo Horn Creek confluence. Although an occasional bison may attempt to winter in habitat along the Gallatin River north of Buffalo Horn Creek, historical reports do not indicate bison use along the Gallatin River northwest of Yellowstone (Meagher 1973).

Representative Comment: 14309I

G Comment: Bison should be kept in the park.

Response: Alternative 5 does not have SMAs, and describes several management actions such as hazing and shooting to ensure bison do not move beyond park boundaries.

Representative Comment: 70B

H Comment: Respondent supported two large SMAs, as described in alternative 2.

Response: An array of different SMAs are described in the environmental impact statement. Within that array, alternative 2 describes the largest area where bison may move outside Yellowstone National Park boundaries, whereas alternative 5 has no SMAs and does not provide for bison movement outside the park.

Representative Comment: 149A

I Comment: SMAs should allow bison unrestricted access on all public lands adjacent to the western and northern boundaries of Yellowstone National Park.

Response: An SMA is defined as "an area contiguous to the park where some or all bison may be tolerated for part or all of the year, as specified in the selected alternative, without increasing the risk of brucellosis transmission to domestic livestock" (see volume 1, "The Alternatives: Actions Common to All Alternatives — Special Management Area"). Some public lands contiguous with Yellowstone National Park extend for tens of miles north in Gallatin National Forest and west in Gallatin and Beaverhead National Forests. All alternatives, except alternative 5, provide for some bison use of public lands. The agencies presented alternatives that balance that use of public lands with the objectives of addressing bison distribution, defining areas beyond which bison would not be tolerated, and protecting livestock from the risk of brucellosis (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," objectives 1, 2, and 5). A similar alternative that contemplated allowing bison to exist with no restriction on distribution was also considered but rejected, because if bison continued to inhabit areas farther north and west of the park, they would encounter a larger percentage of private land, increased human activity and development, and more livestock grazing on public and private lands. Bison movement to suitable habitats much beyond those already described would likely increase contact with cattle and might increase conflicts with other established land uses on private and public lands and human activities. The corresponding social and economic consequences would be substantial, and this alternative was rejected (see volume 1, "The Alternatives: Alternatives Considered but Rejected").

Representative Comment: 1718N

J Comment: No fences or boundaries should be established.

Response: None of the alternatives presented contemplates constructing fences over large areas to control bison movement. This alternative was suggested but not analyzed further because standard fences do not deter bison. Fencing an area, particularly public land, can be expensive, is inconsistent with state and federal wildlife policies and laws, and can have significant impacts on movement of other wildlife species (see volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Alternatives Suggested but Not Analyzed"). The agencies established boundaries in each alternative to meet the objectives of controlling bison distribution (objective 1) and precluding bison movement beyond a particular area (objective 2).

Representative Comment: 3678B

K Comment: Acquire additional winter range in the Gardiner Valley and designate it as an SMA.

Response: The agencies can consider purchasing additional winter range from willing sellers in the Gardiner Valley in alternatives 2, 3, 7, and the modified preferred alternative (please see additional comments and responses in this section and in "Bison: Special Management Areas" above.

Representative Comment: 3976B

L Comment: For the "Citizens' Plan," SMA boundaries should be from the northern park boundary to the mouth of Yankee Jim Canyon and from the western park boundary to the Gallatin National Forest boundary and the Taylor Fork-Buffalo Horn drainage.

Response: In alternative 2 the agencies propose to acquire additional range for bison through the purchase of lands or easements from willing sellers. The northern boundary of alternative 2 involves lands east and west of the Yellowstone River and extends north from the park boundary to Yankee Jim Canyon. The western SMA boundary of alternative 2 follows the Gallatin National Forest boundary along the Montana-Idaho border to approximately Lionhead Mountain and then extends in a northerly direction to the head of Wapiti Creek and courses in a northeasterly direction to the Buffalo Horn Creek drainage. The alternative 2 boundary does not include that portion of the Gallatin National Forest located west of the Hebgen Dam area. It is unknown whether bison would use those public lands on the Gallatin National Forest west of Hebgen Dam. Such use is very unlikely, however, particularly during winter, as these areas

are not known to be historic or current bison winter range. In effect, the SMA boundaries described in alternative 2 are similar to those proposed in this comment

Representative Comment: 14484H

M Comment: For the maps of the alternatives, please explain the difference between the SMA boundary where bison would be allowed and the brown stippled areas labeled as "Areas where bison may occur outside of Yellowstone National Park boundary."

Response: Based on past bison movements and distribution, and agency experience regarding human land use, terrain, snow depth, and forage type and availability, and bison use of the habitat, agency biologists and managers recognized bison would unlikely inhabit most of the area within an SMA, particularly during winter. The brown stippled areas were intended to illustrate those areas where the agencies believe bison would likely be found during winter. The stippled areas do not imply that individual bison could not inhabit other areas within a particular SMA.

Representative Comment: 14819NN

N Comment: SMAs should be those described in the existing *Interim Bison Management Plan*.

Response: The existing *Interim Bison Management Plan* does not specifically describe or identify SMAs. However, for the purposes of this long-term management plan, the areas shown on the alternative 1 map illustrate the areas described in the adjusted plan where bison could move without threatening Montana's federal brucellosis class-free status.

Representative Comment: 14835H

Vaccination (BI-20)

Issue 1: ***Vaccinating Cattle vs. Bison***

A Comment: Several comments advocated the vaccination of cattle and not bison, cattle and bison, or bison and not cattle.

Response: Adequate separation of susceptible cattle from infected bison or bison birth products or an area contaminated by infective birth products would effectively reduce the risk of transmitting brucellosis to zero. However, vaccination of cattle would reduce the number of susceptible cattle even though brucellosis vaccines are not 100% effective. Cattle are routinely vaccinated in the Greater Yellowstone Area with RB51. Vaccinating bison calves with a similarly effective vaccine would help in meeting objective 4, "commit to the eventual elimination of brucellosis in bison and other wildlife," and in the long run would reduce the number of infected and infectious bison. Vaccination of bison with a safe and effective vaccine is part of every alternative for these reasons (see DEIS, p. 59).

Representative Comment: 1066H

Issue 2: ***Other Uses for Money Spent on Vaccine Research***

A Comment: The money that would be spent in researching the vaccine could be better spent on studies to determine first whether *Brucella* really even presents a problem to bison, and on continuing vaccinations of domestic cattle. Or, it could be used to purchase more bison habitat.

Response: Current research has established that brucellosis causes abortions in Yellowstone National Park bison and lesions in the reproductive tracts of bison bulls. Cattle are currently being vaccinated against brucellosis. The purchase of additional habitat for bison would provide additional winter range, but would not reduce disease prevalence, or show a commitment toward the eventual elimination of brucellosis in bison. This is an objective of taking action, as indicated in volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," objective 4.

Representative Comment: 9568F

Issue 3: ***Opposition to Vaccinating Bison***

A Comment: Some commenters opposed vaccination of bison but did not give reasons.

Response: Reducing the risk of transmission of disease to cattle and disease prevalence in bison will likely require several strategies; vaccination of bison with a safe and effective vaccine is the most effective, nonlethal strategy for reducing prevalence of disease in bison.

Representative Comment: Form 45B

B Comment: Vaccination is impractical, prohibitively costly, wasteful, unnecessary, ridiculous, unrealistic, and unworkable.

Response: Vaccination is the most practical, proven, cost-effective, nonlethal means of reducing disease prevalence in an animal population.

Representative Comment: 230G

C Comment: Vaccination is unacceptable because bison are not livestock.

Response: The agencies believe vaccination of bison with a safe and effective vaccine is an appropriate management tool because such a vaccine would protect some bison against infection, provide for protection against abortion, and contribute to reducing seroprevalence in the bison population.

Representative Comment: 199D

D Comment: The effects of brucellosis on cattle and bison are negligible, and don't require vaccination.

Response: Brucellosis can cause abortion, endometritis, orchitis, epididymitis, seminal vesiculitis, and arthritis in cattle and bison, as well as chronic disease in human beings. The economic effects of brucellosis in cattle have been substantial and are well documented (see volume 1, "Purpose of and Need for Action: Background — Economic Impacts of Brucellosis in Cattle" and "Environmental Consequences: Impacts to Socioeconomics — Summary of Benefits and Costs," for more information).

Representative Comment: 9568F

E Comment: It is useless to vaccinate bison because coyotes, elk, and other species carry brucellosis, too. Brucellosis will never be eliminated from Yellowstone National Park wildlife, so there is no use trying.

Response: Eradication of brucellosis is not an objective of the plan. However, in the very near future, the only apparent reservoirs of *B. abortus* that threaten the country's livestock industry or human health in any way will be Greater Yellowstone Area bison and elk. Most other wildlife are dead-end hosts; that is, they do not spread the disease (please see the topics in this volume titled "Wildlife: Brucellosis in Other Wild Ungulates" and "Bison: Brucellosis Transmission and Public Perception" for more information). The commenter correctly notes that the eradication of brucellosis in Yellowstone bison is not possible without concurrent management of the disease in Greater Yellowstone Area elk. (See "Wildlife: Brucellosis in Other Wild Ungulates," issue 3A in this volume for more information.)

Representative Comment: 10557H

F Comment: Vaccination of wildlife is unnecessary because there is no state or federal law or regulation requiring the eradication of *B. abortus* in wildlife. The U.S. Forest Service has no power to require the eradication of the bacteria from wildlife.

Response: The eradication of *Brucella* bacteria from wildlife, including bison, is not a goal of the plan. However, a "commitment to the eventual eradication" of the disease from bison is a goal, as is the protection of Montana livestock from the risk of brucellosis (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," objectives 4 and 5). The agencies believe vaccination of bison with a safe and effective vaccine is an appropriate management tool because such a vaccine would protect some bison against infection, provide for protection against abortion, and contribute to reducing seroprevalence in the bison population. The decision to vaccinate bison with a safe and effective vaccine, which is common to all alternatives, is one that all agencies involved in this planning process agree is appropriate.

Representative Comment: 9382O

G Comment: Vaccinating bison is medically unsound.

Response: Vaccination of animal populations including bison is a long-established, effective practice for producing immunity to disease. Before any vaccine is used on Yellowstone bison, it would first undergo rigorous testing for both efficacy and safety, including safety for nontarget species. Biosafety evaluation for calfhood vaccination is expected to be complete by fall 2001.

Representative Comment: 9348A

H Comment: In pursuit of a vaccine, hundreds if not thousands of healthy animals, many of whom were removed from the wild, have been used in terminal experiments testing the vaccine.

Response: In order to be sure that a vaccine is safe and efficacious in target and nontarget wildlife species prior to using it in a national park, extensive testing is required. Surrogates are used to minimize effects on wild species wherever possible, although both wild and domestic animals have been used to test the safety and efficacy of vaccines.

Representative Comment: 9382O

I Comment: Vaccine safety and efficacy may differ between bison and cattle. For example, cattle receive man-made drugs that free-ranging bison do not receive; the bison could react differently and adversely to the vaccine because they do not receive these drugs.

Response: Current research is establishing the safety and efficacy of RB51 in bison and its safety in nontarget species. Vaccine safety differs between cattle and bison. The GYIBC standards for safety and efficacy of brucellosis vaccines for use in wildlife will be met before a brucellosis vaccine is used in Yellowstone bison. The GYIBC protocol for evaluating safety and efficacy is included in the final environmental impact statement (see "The Alternatives: Actions Common to All Alternatives — Vaccination").

Representative Comment: 10472I

J Comment: Vaccinate bison only if it is proven that bison do indeed transmit brucellosis to cattle.

Response: The transmission of brucellosis from infected bison to cattle has been demonstrated experimentally and must be assumed as a possibility under natural conditions. Current research has documented brucellosis abortions by Yellowstone National Park bison. If these abortions had occurred in the environment in which cattle graze and sufficient temporal separation was not provided, transmission to cattle could occur.

Representative Comment: 3368M

Issue 4: ***Vaccination of Yellowstone Bison***

A Comment: Some comments supported vaccinating bison but did not give reasons.

Response: Supportive comments for vaccinating bison are acknowledged.

Representative Comment: 15A

B Comment: Vaccination is a means to fight/control brucellosis. Vaccinate bison if brucellosis is a threat to adjoining cattle herds. A safe and effective vaccine might reduce brucellosis in bison, wapiti, and other wildlife.

Response: Although the plan does not address other species, vaccination provides the most effective, nonlethal means of decreasing disease prevalence in Yellowstone National Park bison. Even a moderately efficacious vaccine, if delivered to enough animals, would decrease the prevalence of brucellosis in Greater Yellowstone Area bison. The "Environmental Consequences: Impacts on Bison Population" chapter in volume 1 includes an analysis of the effect of vaccination on seroprevalence using a stochastic model. It indicates vaccination alone can be quite effective, reducing seroprevalence from an estimated 36% to 11% in 12 years in the modified preferred alternative, for example. Continuing for another five years beyond the plan would reduce seroprevalence even further, to about 4%, where it appears to stabilize.

Representative Comment: 132C, 5680B, 517B, 5436C

C Comment: Vaccination of brucellosis-free bison is one component of a brucellosis eradication program for bison.

Response: It is true that vaccination of brucellosis-free bison could be one component of a brucellosis eradication program for bison. Although eradication is not an objective of this environmental impact statement, vaccination is a component of all alternatives because it provides the most effective, nonlethal means of decreasing disease prevalence in the bison herd.

Representative Comment: 2029E

D Comment: Vaccinating all bison of all ages would be more humane than killing them.

Response: Vaccination is nonlethal and therefore more humane. However, none of the current brucellosis vaccines provides 100% protection. In all alternatives bison that are not protected by the vaccine and that could become seropositive would be subject to slaughter if they were captured. However, in the long term vaccination would reduce the number of bison subjected to lethal measures because it would reduce seroprevalence. (See also "Bison: Humane Treatment" in this volume for additional comments regarding the humane treatment of bison.) Vaccination would also help eliminate abortions, which are a primary route of infection among cattle and believed to be a primary route of infection in bison.

Representative Comment: 5665A

E Comment: Vaccination would prevent bison from transmitting brucellosis.

Response: Vaccination would reduce the level of brucellosis transmission among bison or from bison to other species by reducing the percentage of the bison herd that is affected with the disease, and by reducing abortions, believed to be a primary route of infection. Both would reduce the possibility of transmitting brucellosis between bison, and from bison to cattle by way of environmental contamination. (Bison would be spatially and temporally kept separate from cattle, so direct transmission would not be possible). However, none of the current brucellosis vaccines provides 100% protection of vaccinates, so unless the disease is eliminated from the herd in the future, there will always be some bison that are infected and capable of transmission.

Representative Comment: 13337G

F Comment: The number of bison to be vaccinated is very small relative to the number of cattle that have been vaccinated over the years. It is a number that can be worked with.

Response: The number of bison that would be subject to vaccination would, indeed, be minuscule compared to the total number of cattle that have ever been vaccinated against brucellosis. However, the nature of the bison and the terrain they occupy would make vaccinating the Yellowstone bison herd logistically more difficult and expensive than vaccinating most cattle herds.

Representative Comment: 15183B, 242C

G Comment: A computer model by John Gross, Colorado State University, strongly suggests that using a vaccine, even one that has a low-to-moderate efficacy, could significantly reduce the prevalence and risk of transmission of brucellosis in bison and elk populations.

Response: This model has been run for the Yellowstone bison herd but not for National Elk Refuge elk. For the bison herd, the model suggests that herd immunity of 20% would be effective in reducing prevalence in the herd while a 10% herd immunity would have virtually no effect. Herd immunity is the

product of vaccine efficacy and delivery rate; for example, 70% efficacy and delivery to 30% of the calves would yield a herd immunity of 21%.

Representative Comment: 9364QQ

H Comment: If infected, the Yellowstone Park herds either need to be vaccinated or isolated, whichever is more practical.

Response: Both strategies are part of every EIS alternative.

Representative Comment: 16829K

Issue 5: ***Bison Vaccination As It Relates to Specific Alternatives***

A Comment: Alternative 5 should be changed to require vaccination of all seronegative bison from the start. Vaccination would protect many bison if they contact infected elk, and it would reduce the time necessary to eliminate brucellosis from the herd.

Response: Alternative 5 does include vaccination of bison during the first phase (i.e., "from the start") if a safe and effective vaccine is available. Alternative 6 relies on several years of vaccination before a parkwide capture, test, and slaughter program begins.

Representative Comment: 10638V

B Comment: Adopt alternative 6 but change the vaccination-only phase from 10 to 5 years. Vaccinate adult bison as well as calves. Use a statistically valid measurable reduction in seroprevalence to determine whether vaccination should continue, or phase 2 (the capture, test, and slaughter phase) should commence.

Response: Volume 1, "Environmental Consequences: Impacts on Bison Population" explains that a more refined stochastic model to assess impacts of different alternatives on seroprevalence and bison numbers and distribution has been created and run since the release of the *Draft Environmental Impact Statement*. In the analysis of alternative 6, the stochastic model indicates it would take about 17 years from the time a safe and effective vaccine for test-eligible bison is administered to the time seroprevalence stabilizes. At this time, vaccine-eligible bison are likely limited to calves, yearlings, and possibly bulls, as safety studies for adult pregnant female bison are several years from completion. A safe and effective vaccine for calves is expected in 2003.

Representative Comment: 9364QQ

C Comment: Under alternative 6 it might save time and money to continue the interim plan until a safe and effective vaccine is available in a few years.

Response: All alternatives that include bison vaccination require the use of at least a safe vaccine for captured bison, and a safe and effective vaccine with a safe and effective remote delivery system for vaccine-eligible bison that are vaccinated in the wild. Since neither is currently available, each alternative would allow for a delay between implementation of the management plan and the startup of bison vaccination. Ongoing studies should confirm the safety and effectiveness of RB51 and should be completed for calfhood vaccination by 2003. Safety studies for calves are expected to be completed by late 2001.

Representative Comment: 15370F

D Comment: The agencies should adopt an alternative that would be similar to alternative 5 or 6, except bison in the park would be vaccinated for a two-year period under phase 1. Phase 2 would be identical to alternative 5 and would begin in year three.

Response: Shortening phase 1 to two years would mean that fewer bison would be vaccinated, herd immunity would be lower, and there would be less time for seroprevalence to decline and stabilize. The result would be that more bison would be eliminated under phase 2 than there would be if phase 1 were longer than two years.

Representative Comment: 10638W

Issue 6: *RB51*

A Comment: A program using serological testing and vaccination with RB51 could eliminate brucellosis from the Yellowstone bison herd in 5–10 years.

Response: This type of program is proposed in alternative 5. An aggressive test and vaccination program would reduce seroprevalence to near zero very quickly, but would also result in the removal of a significant portion of the herd, from 29% (stochastic model) to 43% (deterministic model) in the first year (see volume 1, "Environmental Consequences: Impacts on Bison Population"). Seroprevalence can be effectively reduced to very low levels with a long-term program of bison vaccination, as indicated in the updated analysis of alternative 6 (see "Environmental Consequences: Impacts on Bison Population"). A refined stochastic model indicates that after 17 years of vaccinating calves and yearlings, seroprevalence would be reduced to 4% in the bison population.

Representative Comment: 11108B

B Comment: Although there is still research to be done to document its safety and efficacy in non-bovine species (bison, elk, and even moose), the new RB51 vaccine for brucellosis holds a great deal of promise to fulfill the role as "immunizing agent" for elk and bison.

Response: Despite the limitations of RB51 (such as having less than 100% efficacy and being a live vaccine), it is the most promising vaccine for use in the Greater Yellowstone Area. Its safety and efficacy in cattle approximate those of strain 19 but do not produce positive blood tests, as strain 19 sometimes does. A preliminary study to evaluate strain RB51 vaccination of bison indicates that the vaccine is clinically safe in bison calves and does not induce positive responses on standard blood tests (Olsen et al. 1997). In this same study, adverse clinical signs were not detected following vaccination of bison calves with strain RB51. These calves were raised to maturity, bred, and challenged midgestation with a standard cattle challenge dose of *B. abortus.* Results indicate some protection in bison, but since controls were not included, further work was conducted. Additional work (Olsen et al. 1998) using controls showed calfhood vaccination with RB51 to be effective in preventing abortions in later life. Several projects are underway to further evaluate the level of efficacy of RB51 in calfhood vaccination of bison.

Representative Comment: 1559D

C Comment: Some comments discussed the limitations of RB51, recommending that the limitations be presented in the environmental impact statement.

Response: RB51 is a live vaccine, and as such can be more dangerous to humans or other nontarget species. It is also not 100% effective. RB51 has been shown experimentally to cause endometritis and placentitis, which result in abortion in some pregnant bison (NAS 1998).

Representative Comment: 14819H

Issue 7: *Strain 19*

A Comment: Vaccination with strain 19, along with test and slaughter, has been successful in eliminating brucellosis from cattle and other bison herds.

Response: It is true that strain 19 has been used for many years to vaccinate cattle. However, strain 19 causes some vaccinated calves to test seropositive. This serological response cannot be discriminated from those caused by field strain *B. abortus*, making diagnosis based on blood tests impossible. Additionally, strain 19 has been shown to be more pathogenic in bison than in cattle, and it may cause disease in humans.

Representative Comment: 9209G

B Comment: Texas A&M research has shown that strain 19 is neither safe nor effective in bison. It was not effective when given to calves, and it caused pregnant female bison to abort.

Response: This is correct and is a reason that strain 19 has been eliminated from future evaluation as a vaccine for use in free-ranging bison populations.

Representative Comment: 14397S

C Comment: Animals vaccinated with strain 19 will test seropositive on standard serological tests. As a result, a strain 19 vaccination program for Yellowstone bison will increase the number of seropositive animals in the herd and lead to increased numbers killed as seroreactors.

Response: These statements are correct and indicate why RB51 is preferable to strain 19 for use in Yellowstone bison.

Representative Comment: 14819G

D Comment: Is it possible that strain 19 is the problem with brucellosis in Yellowstone bison?

Response: No. Extensive bacteriologic studies of Yellowstone National Park bison have documented only *B. abortus* biovars 1 and 2, not strain 19.

Representative Comment: 3B

Issue 8: ***A Safe and Effective Vaccine***

A Comment: The agencies should wait until a safe and effective vaccine is available. Other commenters said a delay was not justified, and bison should be vaccinated using only a safe, but not necessarily efficacious, vaccine.

Response: The environmental impact statement calls for the vaccination of captured bison with a vaccine that is safe for all classes, ages, and sexes of bison to which it is administered. This means, for instance, that when a vaccine meets criteria established by the GYIBC for safety in calves, the vaccine would be used on captured calves. If it is not yet proven safe for adults, it would not be administered to captured adults. The calves would be "vaccine eligible." Remote and parkwide vaccination of vaccine-eligible bison would not begin until a safe and effective vaccine for those bison and for nontarget species could be delivered using a safe and effective delivery system. Given the status of ongoing research, it appears that herdwide vaccination of bison calves could begin in the winter of 2003/2004. Please see volume 1, "The Alternatives: Actions Common to All Alternatives — Vaccination," for more information and the GYIBC criteria for a safe and effective vaccine for each age and sex class.

Representative Comment: 8846C, 1207D, 4748A, 4443E

B Comment: Ranchers can vaccinate their cattle or change their cattle operations until a safe and effective vaccine is found to work on bison.

Response: Ranchers in the impact area now all voluntarily vaccinate their cattle against brucellosis. It is a difficult task to switch from breeding herds to steers or spayed heifers (see "Socioeconomics: Cost to Livestock Operators" in this volume for more information), with fundamental changes in nearly all aspects of the livestock operation, from marketing and risk management, to labor and management demands, to capital and noncapital expenses. Given this, it is possible that a safe and effective vaccine would be available for bison much sooner than it would take to make the switch to nonbreeding cattle operations.

Representative Comment: 3374E

C Comment: A safe and effective vaccine is available now. In view of successful brucellosis-free operations on Turner's 'Flying D Ranch' in Montana, and at Wind Cave National Park and Custer State Park in western South Dakota, and at a Nature Conservancy ranch in eastern South Dakota, it is clear that a safe and effective vaccination system exists now.

Response: The seropositive rate was reduced to zero in bison herds at the adjoining Wind Cave National Park and Custer State Park in a 20-year period beginning in the early 1960s using a combination of capture, test, vaccination of seronegatives, and slaughter of seropositives. However, the agencies have agreed it is appropriate to use safety and efficacy criteria established by the GYIBC in the plan. These criteria are quite stringent, but the agencies believe protection of both the bison herd and nontarget species is critical. It is also a poor economic strategy to begin parkwide vaccination until a vaccine is proven to meet effectiveness standards.

Representative Comment: 1005D

D Comment: No criteria are noted in the *Draft Environmental Impact Statement* about what constitutes acceptable levels of safety or efficacy in a vaccine for wild bison. Different levels of safety outside and inside the park are inappropriate. The protocol for determining when a vaccine is safe and efficacious for use in the Greater Yellowstone Area should be followed.

Response: Criteria from the GYIBC have been added and the agencies have agreed that these criteria would be followed in determining whether a vaccine is safe and/or effective for each age, sex, or class of bison listed. These criteria are explained in the final environmental impact statement (see volume 1, "The Alternatives: Actions Common to All Alternatives — Vaccination") and would be applied to bison both inside and outside the park.

Representative Comment: 15420AI, 15420C

E Comment: More money and effort should be put toward developing a bison vaccine, particularly one that is 100% effective. If a vaccine was available, wouldn't the problem have been avoided? Private industry must fund the research to develop an effective brucellosis vaccine.

Response: The agencies have been using funds from joint research on bison and brucellosis, including safety and efficacy studies for a bison vaccine. Biosafety evaluations for calfhood vaccination are expected in the fall of 2001; the safety evaluation for adult bulls has been completed. A majority of the nontarget species safety evaluations have been completed, and the remaining are projected for completion in the spring of 2002. Efficacy evaluations for calfhood vaccination are ongoing and expected to be completed by 2003. The USGS Biological Resources Division has been allocated $250,000 per year since 1997 to help fund this research. Beginning in 1999, the USGS Biological Resources Division, the U.S. Fish and Wildlife Service, and the National Park Service increased funding for vaccine research and development by a combined additional $550,000. No additional funds have been requested for fiscal year 2001, but the National Park Service expects to make a request for money to begin implementation of the vaccination program in fiscal year 2002. Although it would be ideal if a 100% effective vaccine was available, this is not likely to be the case in the near future, as even both strain 19 and RB51 are only 65%–70% effective in cattle.

Representative Comment: 105D, 307A, 664B

F Comment: The *Draft Environmental Impact Statement* should state under objective 4 (p. 29) that the elimination of brucellosis in bison and other wildlife cannot be achieved until a safe and effective vaccine is developed.

Response: The elimination of brucellosis in bison and other wildlife is not an objective of the plan. However, vaccination of bison is a useful tool in reducing seroprevalence. This illustrates a commitment in this plan toward the eventual elimination of the disease, which is what objective 4 states.

Representative Comment: 15367E

G Comment: No national park or refuge should be used as a place to test vaccines that are not already proven to be safe and efficacious.

Response: While we cannot speak for the entire Department of the Interior, the agencies agree that Yellowstone National Park is not an appropriate place to test vaccines, and that vaccines must be proven safe before they are applied at all, and effective before they are applied on a large scale.

Representative Comment: 15420AI

H Comment: The effectiveness of vaccination in bison could be researched in two to three years.

Response: This research is ongoing; and efficacy studies on calfhood vaccination in bison with RB51 should be completed by 2003.

Representative Comment: 306F

I Comment: What if the vaccine causes an existing, benign virus to mutate?

Response: RB51 is the current approved brucellosis vaccine for cattle in the United States. No evidence of viral or bacterial mutation associated with the use of millions of doses of the vaccine used both in extensive experiments and in the field in both cattle and bison has ever been noted. RB51 has also been proven to be genetically stable in experiments in goats and mice (NAS 1998).

Representative Comment: 10472I

Issue 9: ***Which Bison Should be Vaccinated***

A Comment: Require 100% vaccination of Yellowstone's bison herd.

Response: When remote vaccination begins, the agencies would attempt to vaccinate all vaccine-eligible bison. Since research on a safe and effective vaccine for calves is expected to be complete first, remote vaccination will likely begin with calves as the first vaccine-eligible group. As research on other age groups is completed, these groups may be added if the agencies believe vaccinating them will help reduce the risk of transmission. It is possible that repeat vaccination (booster) of bison with RB51 would be added, if research shows it is safe and effective. Although studies are not yet complete, one ongoing project at the Agricultural Research Service facility at Ames, Iowa, is evaluating the safety and efficacy of RB51 booster vaccination of bison yearlings previously vaccinated as calves. Results will be available in 2004. The use of boosters, or safe and effective vaccines for adults, could help achieve near-100% vaccination over time.

Representative Comment: 149E

B Comment: Annual roundup and vaccination of bison cows and calves — as done in Custer State Park — could eventually lead to vaccination of all bison.

Response: Annual roundup and vaccination could be done; however, remote delivery is considered by many to be less stressful, more practical, and more economical, especially given the sometimes remote and difficult terrain of the Yellowstone area.

Representative Comment: 5873A

C Comment: When a safe and efficacious vaccine is available for bison, it should be administered remotely and only to calves.

Response: At this time, it appears the calves will be the first group to be vaccinated remotely with a safe and effective vaccine. If a safe and effective vaccine is available for other age classes, it may be used if the agencies believe it is warranted.

Representative Comment: 823C

D Comment: Can bison with brucellosis be vaccinated? Would there be any advantage?

Response: Limited work in cattle has demonstrated that vaccination of infected animals may reduce the occurrence of abortion and shedding of organisms. No work addressing this question has been done in bison. Generally, however, bison that already have brucellosis would not be helped by vaccinating them, as vaccines provoke an immune response, which should already be ongoing in diseased animals.

Representative Comment: 5781C

E Comment: There should be no vaccinating of bison in or near the park.

Response: We disagree. If the concern is safety of nontarget species (that is, other park wildlife) no vaccine would be administered widely without completing safety work. Ongoing research on several key species, including coyotes, pronghorn, grizzly and black bears, is ongoing and scheduled for completion in spring 2002. Vaccinating bison with a safe and effective vaccine provides the most effective nonlethal method of decreasing disease prevalence in the herd and thereby reducing the risk of transmission to cattle.

Representative Comment: 10520F

Issue 10: ***Vaccine Delivery***

A Comment: A vaccine delivery system should cause the least stress for bison, be safe, not require transportation of relocation or bison, be usable over a wide delivery area, and be the least invasive system possible.

Response: Currently, ballistic injection meets these qualifications. Current research on ballistic injection should determine its safety and efficacy. Other work on oral vaccination is beginning.

Representative Comment: 149E

B Comment: Various methods of delivery were suggested, including oral bait, spraying vegetation with the vaccine, vaccine guns, darts, biobullets, and manual vaccination in capture facilities.

Response: Current research is investigating safety and efficacy of ballistic vaccination and the development of oral vaccination strategies. Hand injection has been previously investigated and found

safe and effective; it would be used to administer a safe vaccine to vaccine-eligible bison in capture facilities.

Representative Comment: 175E

C Comment: The resources needed to remotely vaccinate more than 2,000 bison over thousands of acres would seemingly preclude the use of this strategy. Also, the use of oral baits presents problems of vaccine dosage control and potential effects on nontarget species.

Response: Ballistic vaccination of bison in Yellowstone National Park would involve certain logistic problems. It would involve manpower commitment; however, results of ongoing research involving the periodic darting of Yellowstone National Park study animals with immobilizing agents suggests that ballistic vaccination is feasible. Oral vaccination requires rigorous safety tests of the vaccine in nontarget species. Those nontarget studies are ongoing.

Representative Comment: 9382O

Issue 11: ***Long-Term Vaccination***

A Comment: Some comments suggested that long-term vaccination alone would lead to elimination of brucellosis from the bison. Some suggest 10 years would be needed; others say 15–20 years to eliminate brucellosis.

Response: Current models and experience with cattle, and the analysis in the final environmental impact statement using a stochastic model, do indicate that long-term vaccination with a vaccine approximately as efficacious as strain 19 or RB51 would greatly reduce the prevalence of brucellosis in Yellowstone bison. Seroprevalence in the herd appears to stabilize at about 4% after 17 years of vaccination (assuming efficacy in bison is equal to that in cattle). For this reason, all alternatives rely on vaccination to help manage risk and show a commitment toward the eventual elimination of brucellosis in bison. Although eradication of brucellosis in bison is not an objective of the plan, a commitment to reduce seroprevalence and move toward the eventual elimination of the disease is an objective.

Representative Comment: 269E

B Comment: Vaccination would have to be long term because elk can carry the disease and occur on the same lands as bison and cattle.

Response: Any action to reduce disease prevalence in Yellowstone bison would involve long-term vaccination.

Representative Comment: 10348F

C Comment: If bison vaccination was instituted but later stopped, is there any guarantee that the bison and their offspring will retain their protection? Does such a situation create the necessity of vaccinating all future bison and their offspring?

Response: Vaccination for several years should reduce disease prevalence in the bison herd; if vaccination were stopped before the disease was eliminated, seroprevalence would likely increase again, both from transmission between bison, and possibly from elk to bison. If brucellosis was eliminated from Greater Yellowstone Area bison and elk, vaccination could cease.

Representative Comment: 10472I

Issue 12: ***New Alternatives***

A Comment: Vaccinate part of the herd, and send them to tribal lands.

Response: Bison would first need to complete a quarantine protocol before agencies could be certain they were truly disease free (see "Bison: Quarantine Operations" in this volume for more information). However, they would likely be vaccinated as part of completing quarantine, and be available for tribes or other appropriate recipients.

Representative Comment: 1320A

B Comment: Why have the strays not been tranquilized and properly vaccinated?

Response: No vaccine has been proven safe, efficacious, and safe in nontarget species. That work is ongoing.

Representative Comment: 10297B

Issue 13: ***Bison Vaccination as Part of a Program to Eliminate Brucellosis from the Yellowstone Bison Herd***

A Comment: An aggressively implemented vaccination program would successfully eliminate brucellosis from the bison herd; it needs to be done now.

Response: A vaccination program can be implemented after a vaccine is determined to be safe and effective in bison and safe in nontargets. This work is underway and should be completed within three years. Current models and extensive experience in cattle and captive bison herds suggest that the use of currently available vaccines would reduce disease prevalence and transmission risk but would not completely eliminate the disease.

Representative Comment: 11464A

B Comment: Any vaccination program in the Greater Yellowstone Area will be ineffective unless feedground elk are vaccinated concurrently. Otherwise, they will provide a reinfection reservoir.

Response: Reinfection from feedground elk could be a problem if seroprevalence rates drop in bison to low levels. However, the threat of reinfection would not render a bison vaccination program ineffective, unless the goal was eradication of brucellosis. As noted above, risk management rather than eradication is a goal of the plan, although each alternative does include measures to decrease seroprevalence as evidence of a commitment toward the eventual elimination of the disease in bison.

Representative Comment: 14448A

Ecology (BI-51)

Issue 1: ***Role/Importance of Bison in the Ecosystem***

A Comment: Cattle can be raised anywhere, but bison were here first and the Greater Yellowstone Area is the only place where bison thrive.

Response: The Greater Yellowstone Area is one of several areas in the U.S. where bison exist on public lands. In addition to the bison of Yellowstone National Park and Grand Teton National Park, some of the larger bison herds are maintained on BLM land in the Henry Mountains and Antelope Island in Utah, on U.S. Fish and Wildlife Service (USFWS) land at the National Bison Range in Montana, Fort Niobrara National Wildlife Refuge in Nebraska, and Wichita Mountains National Wildlife Refuge in Oklahoma; on NPS land at Theodore Roosevelt National Park in North Dakota, and Wind Cave National Park and Badlands National Park in South Dakota; and on South Dakota state land at Custer State Park. Only the Greater Yellowstone Area and Henry Mountains populations, however, exist in a non-fenced range or without roundups, culling, or other manipulative management intervention. The Greater Yellowstone Area is therefore important in being home to one of the only truly wild, free-ranging bison populations in the U.S., despite being the most severe North American habitat supporting a viable population of free-ranging bison (Meagher 1971). Yellowstone bison are also the only bison population directly descended from the bison that occupied the area before the exterminations of the late 1800s and early 1900s.

Representative Comment: 219C

B Comment: Bison are a keystone species, indicating ecosystem health. Grasslands, their soils, and all their component species have evolved with bison and therefore depend on bison to persist in a healthy fashion.

Response: A keystone species can be defined as one that affects community or ecosystem structure or function disproportionate to its abundance (Power et al. 1996), or one whose activities modify the species composition of a community and maintain community integrity and persistence (Paine 1969). Although bison play an important role in Yellowstone National Park ecosystem (see volume 1, "Affected Environment: Bison Population — Ecological Role of Bison"), it is not clear whether they function as a keystone species in this system. Grazing by bison can increase the productivity and stability of grasslands, and their pattern of grazing may largely control ecosystem productivity and heterogeneity (Wallace et al. 1997). Some scientists have stated that certain grassland types have evolved to require the intensive grazing pressure of bison (Baumeister 1997). Bison grazing, tree-rubbing, and wallowing may act to maintain open grasslands (Meagher 1973). Bison may historically have affected the extent of woody vegetation on the Great Plains, and bison may also have had a mutualistic relationship with black-tailed prairie dogs (Shaw 1997). Some studies comparing bison and domestic cattle, however, have indicated that cattle may play at least part of the role that bison formerly played in grassland ecosystems. Although cattle and bison have somewhat different food habits and habitat use patterns, the differences between the historic herds of free-roaming bison on pristine grasslands and today's semi-free roaming bison on restricted natural areas is probably much greater than the difference between today's bison and domestic cattle (Plumb and Dodd 1993)

Representative Comment: 10802B

Issue 2: ***Natural Biology, Behavior, Ecology of Bison***

A Comment: The introduction of plains bison into Yellowstone National Park in 1902 damaged the genetic integrity of the herd, which was believed to consist of the "mountain bison" subspecies, and therefore managers should avoid incurring any further genetic damage to the herd. Bison must have large areas over which to roam in order to maintain healthy species evolution.

Response: Currently, there is some debate about whether plains (*Bison bison bison*) and "mountain" or "wood" bison (*Bison bison athabascae*) are in fact distinct subspecies. Four unique genotypes have been

found in bison from Wood Buffalo National Park, Elk Island National Park, and Mackenzie Bison Sanctuary in northern Canada, which indicates some geographical isolation (Strobeck et al. 1993) but not necessarily separate subspecies. Some scientists have stated that the wood bison is an "ecotype," with differing physical characteristics stemming from differences in diet and climate conditions rather than distinct genetic variation (Geist 1991). It is likely that the bison historically inhabiting Yellowstone National Park are a geographic variant of northern plains bison, with physical characteristics influenced by diet and environment but are not genetically distinct from the larger plains bison population. Bison in Yellowstone have been found to have a relatively high level of genetic variation relative to other bison populations, probably due to the fact that they descend from a combination of indigenous animals and bison from both the southern and northern plains herds (Wilson and Strobeck 1997). Research proposed to begin in mid 2000 will include analysis of the genetic structure of the Yellowstone herd and compare it with that of other NPS herds, determine whether nonrandom selection of genetic groups may be occurring in management actions, and evaluate the predicted effects of various population sizes and various management strategies (NPS 1999c). This research may also provide insight into the genetic "health" of the Yellowstone population and its ability to evolve in response to changing environmental conditions. The agencies have stated that they will re-evaluate the minimum population size when new information becomes available and adjust that number if necessary.

Representative Comment: 836C

B Comment: The integrity of the Yellowstone bison herd should be preserved because they are the only descendants from the original free-ranging bison herds that have not been domesticated to some degree.

Response: All alternatives set a lower population limit below which lethal management measures would be reduced or halted, and a minimum population size below which the bison population would not be allowed to drop (refer to the DEIS, "The Alternatives: Actions Common to All Alternatives" and to the text of each alternative). These measures would be taken to ensure that the bison population remains viable and that its genetic integrity is not compromised. Very little data currently exist regarding the minimum viable population size in bison, and no work has been done to evaluate this issue in Yellowstone bison. Given this lack of data, the agencies have relied on limited existing information to establish a number below which this population should not be allowed to go (see "Bison: Population," issue 3A in this volume). The agencies have relied on information provided by Lott (1987), who used computer simulations of public bison herd demographics and mating behavior to estimate that a population of at least 580 bison would be required to prevent inbreeding and potential loss of genetic diversity. The National Park Service is committed to conducting research on the genetics of bison in Yellowstone, along with that of other national park system units that have bison herds. Research proposed to begin in mid 2000 will include analysis of the genetic structure of the Yellowstone herd and compare it with that of other NPS herds, determine whether nonrandom selection of genetic groups may be occurring in management actions, and evaluate the predicted effects of various population sizes and various management strategies (NPS 1999c; also refer to volume 1, appendix D for a list of ongoing and proposed research). The agencies have stated that they will reevaluate the minimum population size when new information becomes available and adjust that number if necessary. None of the alternatives would allow the bison population to drop to this level.

Representative Comment: 1964B

C Comment: Because winter severity, and not population size, determines how many bison will leave the park in winter, more winter range (particularly in the Gardiner area) should be acquired for them to use. The natural habits of bison, particularly their natural tendency to migrate, have been severely disrupted by creating a hard boundary line that they cannot be expected to adhere to. The natural home ranges of many species, including bison, necessarily include lands bordering or outside of Yellowstone National Park.

Response: The 1998 NAS report suggests that bison migration out of the park is related to both population size and to weather. When the bison population is above 3,000 animals, movements out of the park are closely related to measures of winter severity. Below a population size of 3,000, the magnitude of

movements out of the park appear to be unrelated to winter severity and only very loosely related to population size. Learning, social bonds, and the inherently nomadic nature of bison are likely to also play a role in bison movements. Whether recent and current management activities have resulted in lasting impacts to specific behavioral traits, migration habits, knowledge, or other characteristics is not known at this time. Captures and removals of bison in Yellowstone National Park mid-century, during the period of intensive management of all park ungulates, did not appear to impact the ability of the bison population, once released from artificial control in 1968, to increase in number, expand into previously unoccupied habitat, and establish migration routes. The agencies recognize that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in a final bison management plan, to use some lands outside the Yellowstone National Park boundary. The provisions for acquiring access to additional lands outside the park boundary in alternatives 2, 3, 7, and the modified preferred alternative were included in recognition of the fact that in severe winters Yellowstone National Park may not provide adequate winter range for bison due to elevation and snow accumulation. Research is underway to better understand the relationship between bison and habitat in Yellowstone National Park, and the relationships among bison population size, winter severity, and movements outside the park boundary. The research will allow a better understanding of the implications of a variety of management actions on the bison population (see volume 1, appendix D for a list of ongoing and proposed research). Results are anticipated in mid to late 2001. Some private lands outside the park boundary in the Gardiner area have been purchased by the U.S. Forest Service, have had easements created on them, or are being considered for exchanges with other U.S. Forest Service land to "protect significant wildlife migration and winter range habitat from degradation by potential future development" (letter dated August 4, 1999 from the Gallatin National Forest to Mike Finley, Yellowstone National Park superintendent). It has not yet been decided how bison management will be handled on those lands.

Representative Comment: 9025E

Issue 3: ***Ecosystem Health***

A Comment: The uniqueness of the Greater Yellowstone Area ecosystem, which includes bison, should be protected and enhanced, in part because intact, healthy, ecosystems have become rare. The agencies should ensure that this system is "passed on" intact and healthy to future generations. The bison population should be maintained because the integrity of wildlands depends on keeping all of their components.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the continental U.S. (DEIS, p. 137), and bison are an essential component of that ecosystem "because they contribute to the ecological, cultural, and aesthetic purposes of the park" and therefore of the ecosystem in which the park exists (DEIS, p. 11). The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" (DEIS, p. 11). Management actions considered in the alternatives are intended to accomplish both of these goals. In order to ensure the persistence of the bison population, the agencies agreed that each alternative meets the objectives of maintaining a "viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (DEIS, p. 29).

Representative Comment: 759A

B Comment: The control of migratory animals, including ungulates and predators, is necessary to maintain the health of wildlife populations within Yellowstone National Park.

Response: While the "health of wildlife population" is outside the scope of this environmental impact statement, the agencies have agreed that one of the objectives of the plan is to "address bison population size and distribution" and "have specific commitments relating to size of the bison herd" (DEIS, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," p. 29). The policies

of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, unregulated by human removals within the park to the maximum extent possible (NPS 1988).

Representative Comment: 14385A

C Comment: Scientists view national parks as ecological baselines, by which to compare the relative health of systems having more substantial human influence. In order for parks to perform this role, however, the natural processes within parks must be allowed to continue as unimpeded by human influence as possible, and it is appropriate to manage the people around the wildlife. The management actions proposed within the *Draft Environmental Impact Statement*, particularly the arbitrary population cap in the preferred alternative, according to several scientists, constitute a level of intervention that will undermine Yellowstone National Park's value as an "ecological benchmark." The park may be becoming an island ecosystem, with threats of inbreeding and the domestication of bison and other wildlife there.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the U.S. lower 48 states (DEIS, p. 137), and that bison are an essential component of that ecosystem. The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission…" (DEIS, p. 11). Management actions considered in the alternatives presented in the environmental impact statement are intended to accomplish both of these goals. For all alternatives except alternatives 5 and 6, the bison population is expected to be managed by natural processes in the park, and fluctuate within a range predicted by modelling as shown in volume 1, "Environmental Consequences: Impacts to Bison Population." The limit for the bison population of 2,500 animals in alternative 7 was near the midpoint of the long-term population range identified by Boyce's model and incorporated the precept that the size and frequency of bison movements to areas outside park boundaries would be reduced at the lower population levels. A population size of approximately 3,000 was identified (NAS 1998) as a "rule of thumb" above which the frequency and size of bison movements to areas outside the park would increase and is used as a limit to the early spring size of the bison population in the modified preferred alternative. Objective 2 in the environmental impact statement (DEIS, p. 29) states that each alternative must "clearly define a boundary line beyond which bison will not be tolerated." In any SMA or other areas where bison might be permitted outside the park boundary, bison would be managed to meet the objectives set forth in the environmental impact statement, including limiting population size and protecting livestock from the risk of brucellosis through separation in both time and space. See "Bison: Land Acquisition/Easements or Winter Range," and "Bison: Special Management Areas" in this volume for information regarding bison use of areas outside the park. Alternative 5 would preclude bison movement outside the park boundary, and alternative 6 would severely restrict bison use of areas outside the park. It is anticipated that under all alternatives except 5 and 6 that bison will continue to occupy all areas of the park in which they are currently found, and they will continue to provide a food resource to grizzly bears and other wildlife (see volume 1, "The Alternatives" and "Environmental Consequences: Impacts to Bison Population").

Representative Comment: 15420T

Issue 4: *Support/Opposition to Specific Alternatives*

A Comment: Commenters expressed support for alternative 2 because it is the only alternative that maintains a truly wild, free-ranging bison population that can reproduce and die naturally without the influence of groomed roads, and it would create an abundance of winterkill for carnivores within the park.

Response: The purpose of alternative 2 is "to restore as near-natural conditions as possible for bison, including a small portion of their historic nomadic migration patterns" (DEIS, p. 67). The agencies agreed, however, that each alternative must clearly define a boundary beyond which bison will not be tolerated (DEIS, p. 29), recognizing that land use in much of historic bison habitat is no longer compatible with the presence of large numbers of bison. Accordingly, some bison may be hazed or shot when attempting to cross the established boundary. Analyses of all alternatives (using a stochastic modelling

approach since the *Draft Environmental Impact Statement* was completed) indicates that alternative 2 would result in the largest projected bison population of all the alternatives. With the larger population, a higher level of winterkill would be expected and would provide a somewhat larger source of carrion for carnivores and scavengers. Ongoing research (Bjornlie 2000) indicates that approximately 85% of bison movement occurs on trails that bison themselves maintain during winter and about 15% use groomed road surfaces. It is unlikely that cessation of road grooming would preclude or substantially impair bison movement beyond park boundaries to adjacent management areas. With larger numbers of bison occupying management areas, increases in private property damage is expected, as well as increased roadkill on highways in the management areas. All alternatives have a boundary beyond which bison are not allowed, and with a higher bison population more bison are projected to be removed at or beyond the boundary under alternative 2 compared to other alternatives (33% higher than alternative 1). An estimated 6,208 bison are projected to be removed over the life of the plan. Since capture operations occur during phase 1 and are discontinued during phase 2, most bison would be removed through shooting during phase 2.

Representative Comment: 9568E

B Comment: Some commenters expressed support for alternative 7 because it allows nature "to take its course within the park [Yellowstone National Park] boundaries." Other commenters stated that alternative 7 will threaten the ecological integrity of Yellowstone National Park by treating the bison like cattle.

Response: Although the agencies agreed to limit the bison population to 2,500 bison in alternative 7, this would only take place during winters when bison moved beyond park boundaries and were subject to management actions at the boundary or in the SMAs . It is likely that the overall bison population size will be dictated primarily by weather and forage production and less by management actions. It is also likely that portions of the bison population may be subject to capture and handling in some years, but that in the majority of years, most bison will exist with very little human intervention in their actions or distribution. It is anticipated that under this alternative bison would continue to occupy all areas of the park in which they are currently found and would continue to provide a food resource to grizzly bears and other wildlife (refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts to Bison Population").

Representative Comment: 13028A

Issue 5: *Impacts of Alternatives*

A Comment: Placing bison in quarantine will damage habitat and disrupt natural behavior of bison.

Response: Any quarantine facility built and operated would require a separate environmental review by federal and state agencies; such a review would include an assessment of potential effects on habitat. Confining bison to a quarantine facility for the required period (anywhere from one to approximately four years) is likely to disrupt the natural behavior of the confined bison. See "Bison: Quarantine Operations" in this volume for further details about how quarantine facilities would be constructed and managed. Also refer to volume 1, "Purpose of and Need for Action: Background — Brucellosis in Bison and Cattle," and "Process for Bison Quarantine" for an overview of the quarantine procedure, and to appendix B, which describes the APHIS quarantine procedure for bison.

Representative Comment: 1821C

B Comment: The proposed management actions will have impacts on a variety of species, as noted in the *Draft Environmental Impact Statement*, and will therefore create ecological disruptions that will be felt throughout the entire Greater Yellowstone ecosystem. The removal of a species from the system may have much broader impacts than we have the capacity to predict or understand.

Response: The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" (DEIS, p. 11). Management actions considered in the

alternatives are intended to accomplish both of those goals. None of the alternatives would result in the removal of bison or any other species from the ecosystem. In order to ensure the persistence of the bison population, the agencies agreed that each alternative must meet the objectives of maintaining a "viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (DEIS, p. 29). For all alternatives except alternatives 5, 6, and 7, the bison population is expected to fluctuate between 1,700 and 3,500 animals , influenced largely by environmental factors and to varying degrees by the management activities specified under each alternative. The limit for the bison population of 2,500 animals in alternative 7 was near the midpoint of the long-term population range identified by Boyce's model and incorporated the precept that the size and frequency of bison movements to areas outside the park boundary would be reduced at the lower population levels. It is anticipated that under all alternatives except 5 and 6 bison would continue to occupy all areas of the park where they are currently found and would continue to provide a food resource to grizzly bears and other wildlife (refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts to Bison Population").

Representative Comment: 5854G

C Comment: The strategy of migrating to seek food in severe conditions may be evolutionarily important, and therefore killing animals that migrate beyond park boundaries may interfere with the natural adaptability of bison by removing animals with important survival information (migration routes, productive habitats, etc.)

Response: The NAS report (1998) suggests that bison migration out of the park is related to both population size and weather. When the bison population is above 3,000 animals, movements out of the park are closely related to measures of winter severity. Below a population size of 3,000, the magnitude of movements out of the park appear to be unrelated to winter severity and only very loosely related to population size (see "Bison: Population" in this volume for more information). Learning, social bonds, and the inherently nomadic nature of bison are likely to also play a role in bison movements. Whether recent and current management activities have resulted in lasting impacts to specific behavioral traits, migration habits, knowledge, or other characteristics is not known at this time. Captures and removals of bison conducted mid century in Yellowstone National Park during the period of intensive management of all park ungulates did not appear to impact the ability of the bison population, once released from artificial control in 1968, to increase in number, expand into previously unoccupied habitat, and establish migration routes. Research is underway to better understand the relationship between bison and habitat in Yellowstone National Park, and the relationships among bison population size, winter severity, and movements outside the park boundary and to better understand the implications of a variety of management actions on the bison population (refer to volume 1, appendix D for a list of ongoing and proposed research). Results from this research are anticipated in mid to late 2001.

Representative Comment: 4445P

D Comment: Bison that test positive for brucellosis may be immune to the disease, so removing those bison may impair the genetic and overall health of the population.

Response: Information is not currently available to assess whether some bison testing positive may be immune to brucellosis. A gene has been found in domestic cattle that appears to confer natural resistance to brucellosis, and limited research has indicated that this gene may also be present in some bison. However, these bison would be negative to the brucellosis tests (Templeton et al. 1997). New research is proposed to survey bison in Yellowstone and Grand Teton National Park for this gene and to determine the frequency at which it occurs (NPS 1999c). This information may then be used, along with data obtained on brucellosis in Yellowstone bison from other current research projects (see volume 1, appendix D for a list of current and proposed research projects), to adjust management policy if appropriate. However, although it is possible that a small percentage of bison may be genetically resistant to brucellosis, those animals would likely test negative on the brucellosis tests, and would not be removed from the population. In bison, immunity is believed to be a cellular immunity. When antibodies are

produced (thus causing a positive blood test), they do not indicate immunity, but rather they indicate exposure to *B. abortus.*

Representative Comment: 14623C

Issue 6: ***Additional Analysis, Corrections, Omissions, etc.***

A Comment: The *Draft Environmental Impact Statement* does not fully explain why Yellowstone National Park is not a complete ecosystem for bison without the addition of SMAs outside the park. The addition of the proposed SMAs will still not make the area a complete ecosystem for bison.

Response: The NAS report (1998) suggested that bison migration out of the park is related to both population size and to weather. When the bison population is above 3,000 animals, movements out of the park are closely related to measures of winter severity. Below a population size of 3,000, the magnitude of movements out of the park appears to be unrelated to winter severity and only very loosely related to population size. These findings suggest that access to forage during severe winters when the population is relatively high tends to drive bison movements. In other words, the park does not provide adequate low-elevation lands where bison can find forage during years when extreme snow depths or densities prevent access to forage that can be used during average winters. For example, during the unprecedented harsh winter of 1996–97, nearly all the northern range bison attempted to exit the park in search of accessible forage (NPS, unpubl. data). Bison (weighing approximately 700–1,500 pounds) were observed walking on top of crusted snow more than 3 feet deep in areas they are normally able to crater to find food. The addition of SMAs, particularly in the north boundary area, may act as a buffer during extreme winters, providing some low elevation, relatively snow-free habitat for bison to use. Research is underway to better understand the relationship between bison and habitat in Yellowstone National Park, the relationships among bison population size, winter severity, and movements outside the park boundary. Results from this research are anticipated in mid to late 2001.

Representative Comment: 9364CC

B Comment: The *Draft Environmental Impact Statement* failed to address the ecology of *B. abortus* bacteria in the Greater Yellowstone Area, and whether it is endemic and has evolved with the wildlife in the Greater Yellowstone Area.

Response: It is considered very likely that brucellosis in GYA wildlife originated with transmission from domestic livestock. According to the NAS report (1998), the historic presence of numerous herds of free-ranging domestic livestock throughout the west make it likely that brucellosis was originally transmitted to bison and other wildlife during that time. Meagher and Meyer (1994) state that transmission from cattle to bison probably occurred multiple times, and the distribution *of B. abortus* in the Greater Yellowstone Area and the presence of more than one strain indicate multiple exposures in elk as well (Thorne et al. 1991). Brucellosis in Yellowstone bison is likely to have originated with domestic cattle pastured at various locations throughout the park early in its history (Meagher and Meyer 1994), although it has been suggested that brucellosis may have entered the population with bison imported in 1902 to augment the park's small, declining bison population. There is little question that brucellosis in Greater Yellowstone Area wildlife originated with transmission from domestic livestock, and that although bison and other wildlife have coexisted with the bacteria for nearly a century, the *B. abortus* bacteria can be considered an introduced organism.

Representative Comment: 3738F

C Comment: Although during scoping the public identified a desire for ecosystem-based management, the environmental impact statement fails to do this. The *Draft Environmental Impact Statement* fails to analyze the impacts of the alternatives in terms of the whole ecology of Yellowstone National Park and the SMAs, and the agencies should address management of the ecosystem as a whole, including surrounding lands, rather than focusing on individual species and specific issues, such as disease. The

agencies should develop new alternatives that focus more on bison biological data rather than brucellosis disease data.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the continental U.S. (see DEIS, p. 137), and that bison are an essential component of that ecosystem "because they contribute to the ecological, cultural, and aesthetic purposes of the park" and therefore of the ecosystem in which the park exists (DEIS, p. 11). The purpose of the management plan, however, is "to maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana" (DEIS, p. 11). Management of other species or of entire community assemblages is beyond the scope of this planning document. Management actions considered under this plan must also address both portions of the purpose statement, which includes disease risk management.

Representative Comment: 11121K

D Comment: Any alternatives calling for the closing of groomed snowmobile trails will be ineffective in preventing bison from migrating out of Yellowstone National Park, because bison will revert to river corridors and other means to exit the park.

Response: The purpose in alternative 2 of closing groomed snowmobile roads is to "restore as near-natural conditions as possible for bison," and it is assumed that this action would help control bison distribution and population size (refer to DEIS, p. 67). he presence of a plowed road may have facilitated bison learning the route to areas outside the park near Gardiner, MT, during a harsh winter and consequent stress dispersal (Meagher 1989a). Groomed roads may also have contributed to the redistribution of bison within park boundaries (Meagher 1997). It appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward the park boundary may occur on such routes. However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas, and westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, thus accomplishing the goal of restoring "as near-natural conditions as possible for bison." By having these effects, closure of groomed roads could also reduce the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (see volume 1, appendix D for a list of current and proposed research projects).

Representative Comment: 15451B

E Comment: The *Draft Environmental Impact Statement* fails to provide a discussion of the full role of the original, free-ranging bison herds in both natural and human ecosystems, and it does not adequately analyze the cumulative impacts of bison management activities on other wildlife species.

Response: Unfortunately, little is known about the ecology of the original North American bison herds. Most of what is known comes from historical accounts, which are often relatively unscientific and subject to various biases, and from modern field studies, most of which have been conducted on small, remnant, and confined herds (Shaw 1997). As indicated in the DEIS (p. 148), we know that grazing by bison can increase the productivity and stability of grasslands, and their pattern of grazing may largely control ecosystem productivity and heterogeneity (Wallace et al. 1997). Some scientists have stated that certain grassland types have evolved to require the intensive grazing pressure of bison (Baumeister 1997). Bison grazing, tree-rubbing, and wallowing may act to maintain open grasslands (Meagher 1973). Bison may historically have affected the extent of woody vegetation on the Great Plains, and bison may also have had a mutualistic relationship with black-tailed prairie dogs (Shaw 1997). It is anticipated that under all

alternatives except 5 and 6 that bison would continue to occupy all areas of the park in which they are currently found, and they would continue to provide a food resource to grizzly bears and other wildlife (refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts to Bison Population").

Representative Comment: 9369A

F Comment: The *Draft Environmental Impact Statement* fails to adequately discuss the historic use and availability of bison habitats outside Yellowstone National Park, or the importance of bison access to those habitats. An alternative should be developed that allows all native ungulates, including bison, first use of summer and winter range in the Greater Yellowstone Area. Bison should be allowed to use winter ranges, as are other migratory wildlife.

Response: In developing the purpose and need for action, the agencies recognized that "bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in a final bison management plan, to use some lands outside Yellowstone National Park. The provisions for acquiring access to additional lands outside the park boundary in alternatives 2, 3, and 7 were included in recognition of the fact that in severe winters Yellowstone National Park may not provide adequate winter range for bison due to elevation and snow accumulation. These provisions also recognize that bison tend to use the identified areas during some winters, although detailed information on bison use is not available since bison have generally not been allowed to fully use those lands. Unfortunately, little is known about the ecology of the original North American bison herds, including bison of the Greater Yellowstone Area. It is anticipated that in the future, bison may be managed similar to other migratory wildlife species such as elk, whether or not a hunting season is reestablished for bison in Montana. No population sizes are set for elk, for example, within the park boundary, but the Montana Department of Fish, Wildlife and Parks sets habitat and in some cases population objectives for elk outside the park boundary. Elk are managed to meet these objectives through a regulated annual hunting season. The National Park Services cooperates with Montana Department of Fish, Wildlife and Parks in gathering elk population data, including counts and herd composition estimates, that the Montana Department of Fish, Wildlife and Parks uses in setting elk hunting quotas and regulations

Representative Comment: 15420AA

G Comment: An alternative should be developed that views the bison as a wildlife population in flux, influenced by natural factors, rather than as livestock.

Response: NPS *Management Policies* have a goal of allowing natural processes to regulate the fluctuation in populations of native species to the greatest extent possible (NPS 1988). For all alternatives except alternatives 5, 6, and 7, the bison population is expected to fluctuate between 1,700 and 3,500 animals, influenced largely by environmental factors and, to varying degrees, by the management activities specified under each alternative. The limit for the bison population of 2,500 animals in alternative 7 was near the midpoint of the long-term population range identified by Boyce's model and incorporated the precept that the size and frequency of bison movements to areas outside the park boundary would be reduced at the lower population levels. Population control under this alternative, however, would take place only during winters when bison move beyond the park boundary. Therefore, the bison population is expected during most years to fluctuate largely in response to environmental factors and to varying degrees by management activities.

Representative Comment: 400E

Issue 7: *Miscellaneous*

A Comment: Maintaining Yellowstone bison as a free-ranging herd is important as a symbol of the government's commitment to biodiversity and wildlife conservation.

Response: NPS *Management Policies* have a goal of allowing natural processes to regulate the fluctuation in populations of native species to the greatest extent possible (NPS 1988). The purpose of a bison management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" (DEIS, p. 11). Management actions considered in the alternatives presented in the environmental impact statement are intended to accomplish both of those goals. In order to ensure the persistence of the bison population, the agencies agreed that each alternative meets the objectives of maintaining a "viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (DEIS, p. 29).

Representative Comment: 352B

B Comment: Human activities, including the grooming of roads in the winter, changes bison behavior and decreases their access to food, which contributes to the migration of bison out of Yellowstone National Park. Some commenters suggested that food should be provided to counteract that tendency and entice bison to remain in the park during the winter.

Response: Groomed roads may have contributed to the redistribution of bison within park boundaries (Meagher 1997). It appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and much of their movements toward park boundaries may occur on such routes. However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas, and westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads might not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (see volume 1, appendix D for a list of current and proposed research projects). The *Draft Environmental Impact Statement* (p. 38) provides information as to why the agencies have not considered feeding bison to keep them within the park boundary. In summary, consistent supplemental feeding would do nothing to relieve the pressures leading to migrations, while it would contribute to increased population size. Feeding may damage habitat by concentrating bison in feeding areas and increase disease prevalence by concentrating animals at times when transmission is most likely.

Representative Comment: 1335A, 2082J

C Comment: The reintroduction of wolves will restore the natural "balance" of the ecosystem and limit the bison population, and this should be allowed to occur without interference. Wolves will cull the weak and diseased, rendering alternative 7 unjustified.

Response: Boyce and Gaillard (1992) predicted that predation by wolves is likely to decrease the average bison population by less than 15%. This level of predation was included in the predictions of bison population range used in the *Draft Environmental Impact Statement*. Boyce (1990) also predicted that wolves might reduce the variation in bison population size by approximately 10%. Currently, predation by wolves appears to be a very minor source of mortality for bison (Smith et al. 1999). In the Yellowstone National Park northern range elk are much more available and represent easier prey for wolves than bison, and in the Madison-Firehole area elk are present, but less abundant than bison, during certain times in the winter and may represent easier prey (Smith et al. 1999). It is possible that wolves may eventually have some impact on bison numbers in the Pelican Valley, where elk are not present during the winter, and in

localized portions of the Madison-Firehole area. While the wolf population has been increasing, predation by wolves is not expected to influence the total bison population size (D. Smith, NPS, pers. comm.). The Yellowstone Center for Resources staff have been and will continue to monitor wolf predation on bison (Smith et al. 1999) and will periodically assess impacts on the bison population. Should wolves begin to have an impact on bison, the National Park Service will review bison population goals and adjust management actions appropriately.

Representative Comment: 2341C

D Comment: The presence of ranching activity within a "significant portion" of the Greater Yellowstone Area constitutes a major disruption to the ecosystem, preventing the area from being a truly intact ecosystem.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the continental U.S. (DEIS, p. 137). It is also recognized that a variety of human activities have had impacts on the ecosystem, and increasing levels of some activities pose threats to various aspects of ecosystem integrity. These issues, however, are beyond the scope of this environmental impact statement.

Representative Comment: 9092B

E Comment: Reference to Yellowstone bison as "wild" is incorrect; they are no more wild than some cattle herds.

Response: The agencies have defined "wild and free-ranging" as "not routinely handled by humans" and able to "move without restrictions within specific geographic areas" (refer to DEIS, p. 28). The Yellowstone bison population occupies one of several areas in the U.S. where bison exist on public lands. Only the Yellowstone, Henry Mountains (Utah), and House Rock (Arizona) populations, however, exist in a nonfenced range or without roundups, culling, or other manipulative management intervention. Although some proportion of Yellowstone bison have become habituated to humans, they are considered wild by the agencies' standards. Yellowstone bison are also the only bison population directly descended from the bison that occupied the area prior to the exterminations of the late 1800s and early 1900s.

Representative Comment: 10555B

F Comment: Maintaining multiple bison herds in different geographic areas would provide valuable information about bison ecology for bison management decisions.

Response: The Greater Yellowstone Area is one of several areas in the U.S. where bison exist on public lands. In addition to the bison of Yellowstone National Park and Grand Teton National Park, some of the larger bison herds are maintained on BLM land in the Henry Mountains and Antelope Island in Utah; on USFWS land at the National Bison Range in Montana, Fort Niobrara National Wildlife Refuge in Nebraska, and Wichita Mountains National Wildlife Refuge in Oklahoma; on NPS land at Theodore Roosevelt National Park in North Dakota, and at Wind Cave National Park and Badlands National Park in South Dakota; and on South Dakota state land at Custer State Park. A variety of research projects have been conducted on these herds, as well as on free-ranging bison populations in northern Canada. The agencies have agreed that one objective of this management plan is to develop management actions that are "based on factual information, with the recognition that the scientific database is changing" (DEIS, p. 30). The agencies will consider new data from the Yellowstone population and other bison herds as it becomes available and make management adjustments where appropriate.

Representative Comment: 13108G

G Comment: Allowing bison to function naturally in the system, including allowing them to die of winterkill, provides people with an opportunity to learn about the natural world, including nutrient cycling.

Response: A goal of the NPS *Management Policies* allows natural processes to regulate the fluctuation in populations of native species to the greatest extent possible (NPS 1988). In all alternatives except 5 and 6 the bison population would be allowed to fluctuate largely in response to environmental factors. Management actions would influence bison numbers only during winters when significant numbers of bison move beyond the areas established for their use as winter range. It is anticipated that under all alternatives except 5 and 6 bison will continue to occupy all areas of Yellowstone National Park where they are currently found. Death from winterkill or predators will continue to occur (refer to volume 1, descriptions of alternatives in "The Alternatives" and "Environmental Consequences: Impacts to Bison Population"). Therefore, the opportunity will continue to exist for visitors to witness the full life cycle of bison.

Representative Comment: 15168A

Brucellosis in the Yellowstone Bison Herd (BI-22)

Issue 1: ***Eradicate Brucellosis in the Yellowstone Herd***

A Comment: More scientific study of transmission among free-ranging ungulates is needed in order to eradicate brucellosis in bison, or to have eradication as an objective. Some commenters questioned why the plan fails to address eradicating brucellosis from the Greater Yellowstone Area.

Response: Although one of the objectives of the management plan is to "commit to the eventual elimination of brucellosis in bison and other wildlife" (DEIS, p. 29), the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of the management plan." While some alternatives presented in the *Draft Environmental Impact Statement* (alternatives 5 and 6) contain elements that more rapidly reduce seroprevalence in bison, they employ more lethal management actions that significantly reduce the bison population and may have adverse impacts on other wildlife species. The agencies recognize that the presence of brucellosis in elk in other portions of the Greater Yellowstone Area may result in reinfection of the Yellowstone bison population (NAS 1998). The NAS report (1998) represented an important first step in gathering and analyzing available data pertinent to the brucellosis issue. In their report the investigators made numerous recommendations as to research needed to clarify many of the issues involved in understanding brucellosis in the Greater Yellowstone Area. The agencies are committed to pursuing a variety of research projects to better understand brucellosis in wildlife and the risk of transmission to cattle. The modified preferred alternative contains adaptive management measures, one of which calls for the use of telemetry to monitor seronegative pregnant female bison in areas outside the park. This would allow the agencies to closely monitor birth events and birth sites, as well as determine other important information regarding seronegative bison. Refer to volume 1, appendix D for a complete listing of brucellosis/bison/elk information needs and research topics that are recognized by the agencies as important to the brucellosis management issue. Refer to volume 1, "Purpose of and Need for Action: Background — Brucellosis in Other Wildlife," and to responses to comments under "Brucellosis in Other Wildlife" in this volume for more information regarding what is known about brucellosis in, and transmission among, other free-ranging ungulates in the Greater Yellowstone Area.

Representative Comment: 918G

B Comment: The predicted reduction in seroprevalence through test and slaughter, as shown in table 37 of the *Draft Environmental Impact Statement*, appears unrealistic (this table refers to alternative 5).

Response: In describing the alternative and estimating the effects of the capture, test, and slaughter operations, it was assumed that operations would take place at nine capture facilities simultaneously within and at the boundaries of the park. Simultaneous capture operations would be necessary to reduce the likelihood that untested (and potentially infected) bison would remain and intermingle with the remaining seronegative bison. All seropositive bison would be sent to slaughter. During the last years of the capture operations all unmarked (untested) bison more than one year old that could not be captured would be shot. In the *Draft Environmental Impact Statement* it was assumed that about 95% of the bison population would be captured each year. These operations would be very intrusive and expensive, and they would have effects on other wildlife and visitors as well. Because of the seroprevalence rate in the population at the start, it would also reduce the bison population by about 47% in the first year of operation. A more complex model incorporating stochastic variables was developed after the *Draft Environmental Impact Statement* was completed, and the results of the reanalysis have been incorporated into the analyses of each of the alternatives. That model assumes a 90% annual capture rate and at this rate projects that it would require four years to reduce the mean seroprevalence rate to below 1% (0.1%) and the bison population would be reduced by 29% in the first year. These rates are similar to the results of the deterministic model presented in the *Draft Environmental Impact Statement*. An additional modelling effort (J. Gross, USGS-BRD, unpubl. data) suggests that conducting test and slaughter operations on more than 80% of the bison population annually could reduce seroprevalence to roughly 1%–2% within approximately four years. According to this model, however, such actions would also reduce the bison population by approximately half during that time period. Vaccination of calves with a vaccine with an

estimated efficacy of 70% would maintain the seroprevalence rate below 1% for the remaining life of the plan. Vaccination would need to continue indefinitely due to the potential reinfection from elk. Without continued calfhood vaccination, seroprevalence would likely return within 20 years to the levels observed prior to implementation of capture, test, and slaughter.

Representative Comment: 5638G

C Comment: If brucellosis was eradicated from Yellowstone bison, the park could "boast" of having a disease-free herd. Other commenters stated that brucellosis should be eradicated from Yellowstone National Park bison because it is an exotic organism. Respondents questioned whether brucellosis affects the "quality" of the Yellowstone bison herd.

Response: As stated in responses to other comments in this section and in "Wildlife: Brucellosis in Other Wild Ungulates" in this volume, the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope" of the management plan (DEIS, p. 29). Although the *B. abortus* bacteria was most likely introduced into Yellowstone bison through contact with cattle either in Yellowstone National Park or indirectly via bison introduced into the park in 1902 (NAS 1998), the presence of brucellosis in Yellowstone bison does not appear to have a noticeable effect on the population or on the visual aspect of the bison. The bison population in Yellowstone National Park has continued to increase despite the presence of the *B. abortus* bacteria in the population (NAS 1998). However, the *B. abortus* organism does have an effect on some individual bison, and may cause clinical signs such as abortion, or the birth of weak calves that may subsequently die, or orchitis (inflammation of the testicles), testicular abscesses, or seminal vesiculitis.

The elimination of brucellosis in Yellowstone might have the beneficial impact of removing the rationale for certain restrictive and/or lethal management actions, but it is not likely to result in any change in the biology, ecology, or visual aspect of bison.

Representative Comment: 9043E

D Comment: The creation of SMAs would simply expand and perpetuate the brucellosis problem.

Response: The agencies recognized that "bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions, to use some lands outside the Yellowstone National Park boundary. Objective 2 (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action") states that each alternative must clearly define a boundary line beyond which bison will not be tolerated. The modified preferred alternative designates different zones wherein management actions become increasingly intense as bison approach the edge of the boundary areas. These management zones ensure spatial and temporal separation of bison and cattle and are similar to the "buffer zones" that were described in the NAS 1998 report as areas where "management can facilitate the transition between goals of two contrasting land uses." These management zones provide tolerance for bison primarily during winter months. For the northern boundary area, the modified preferred alternative establishes three zones. Bison would be managed differently in each zone depending on their relative proximity to Yankee Jim Canyon. Four zones would be established in the West Yellowstone region of the western boundary area. Because there are private lands outside the boundaries that may have cattle present year-round, the fourth zone is included as an extra buffer between the bison herd and cattle. The zones and management actions for each are described in the final environmental impact statement under "Modified Preferred Alternative: Management in Boundary Areas." Yellowstone National Park has also committed to providing staff for the continuous monitoring of bison and coordination of management actions within these zones from mid-November through mid-May.

For alternatives that do include the establishment of SMAs, bison would be expected to use only small areas within the SMA boundaries during winter due to topography and snow depth. Potential use of the

areas would be limited to winter months when cattle are not present on private or public lands. In any SMAs or other areas where bison might be permitted outside the park boundary, bison would be managed to meet the objectives set forth in the environmental impact statement, including limiting population size and protecting livestock from the risk of brucellosis through separation in both time and space. Please refer to "Bison: Land Acquisitions/Easements or Winter Range," and "Bison: SMAs" in this volume for more information regarding bison use of areas outside the park.

Representative Comment: 11464A

E Comment: Why has brucellosis not yet been eliminated from Yellowstone bison, since it has been done in other parks, private herds, and public herds? The National Park Service should conduct eradication wholly within park borders since the National Park Service is responsible for this population.

Response: As stated in responses to other comments here and under the issue "Wildlife: Brucellosis in Other Wild Ungulates," the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope" of the management plan (DEIS, p. 29). While some alternatives presented in the *Draft Environmental Impact Statement* (alternatives 5 and 6) contain elements that more rapidly reduce seroprevalence in bison, they employ more lethal management actions that significantly reduce the bison population and may have significant adverse impacts on other wildlife species (please refer to the updated analysis of alternative 5 in volume 1).

Furthermore, the presence of brucellosis in elk in other portions of the Greater Yellowstone Area would likely result in eventual reinfection of the Yellowstone bison population (NAS 1998). Brucellosis has been successfully eradicated in other public and private herds that are generally much fewer in number, exist in relatively small, fenced areas, and are routinely handled (e.g., Wind Cave National Park, Custer State Park, and Wichita Mountains National Wildlife Refuge).

Both Wind Cave and Custer are fenced areas where complete enumeration and control of the bison herd is possible. The Wind Cave and Wichita Mountains herds were relatively small (250 – 800) at the time of eradication, and the Custer herd was reduced by over half at the time eradication was taking place. Brucellosis was detected in only 11 bison in the small Henry Mountains bison herd in Utah in 1960; those bison were marked and subsequently hunted. It appears that exposure had been limited to those animals that were removed, because the herd has been brucellosis-free since that time. From the 1930s through 1967 the National Park Service engaged at times in intensive management of the Yellowstone bison population, reducing numbers through capture and culling operations and removing of bison to other areas of the park and to other public herds. Although some vaccination took place, it appears to have been of limited extent and duration (M. Meagher, pers. comm.). Brucellosis eradication was not a stated management goal during that time. Since then, the bison herd has grown and expanded to occupy large areas of Yellowstone National Park, including many remote and inaccessible locations. Eradication programs of the type carried out in other herds, where the area occupied by bison is small compared to the park's bison habitat and is in most cases entirely fenced, would require extensive and costly efforts to capture, test, and slaughter bison throughout the park, as described in alternatives 5 and 6. Over the long term such efforts would likely prove unsuccessful due to the presence of brucellosis in several Greater Yellowstone Area elk herds.

Representative Comment: 11531D

Issue 2: ***Transmission between Bison and Cattle, Cattle and Bison***

A Comment: The *Draft Environmental Impact Statement* must explain that transmission from bull bison and from immature females does not occur. Other commenters stated that if one bison gets brucellosis, it becomes contagious.

Response: Although *B. abortus* has been detected in bison semen and the transmission of brucellosis through contact during breeding can occur, the risk of transmission from bulls to cattle appears to be

"vanishingly small" (NAS 1998; also refer to the Greater Yellowstone Interagency Brucellosis Committee 1995 report, and to the DEIS, p. 20). The NAS report (1998) noted that the spread of brucellosis is highly associated with abortion and the birthing process, neither of which can occur until a female is sexually mature.

APHIS has stated that male bison and calf and yearling bison do not present a significant risk of transmitting brucellosis to cattle. Factors influencing risk of transmission are detailed in the environmental impact statement (DEIS, p. 19). Refer also to "Bison: Brucellosis Transmission and Public Perception" and "Bison: Brucellosis Risk Management" in this volume for more information.

Representative Comment: 90C

B Comment: No documented cases of transmission between bison and cattle have occurred under natural conditions. Others stated that the intermingling of bison and cattle in Grand Teton National Park has not resulted in transmission.

Response: While it is true that there have been no documented cases in which transmission of brucellosis was transmitted from bison to cattle, such transmission has taken place under experimental conditions with artificially infected bison. Such experiments demonstrate that although the possibility of transmission under natural conditions appears to be small, it is not zero. As noted in the *Draft Environmental Impact Statement* (p. 19), transmission requires that a susceptible animal "come in contact with an infectious animal or discharges that contain a sufficient dose of viable *Brucella* organisms. Separation in space and time reduces the potential for transmission." All alternatives are designed to maintain spatial and temporal separation between bison and cattle, and all include additional measures to further reduce the risk of transmission.

Representative Comment: 2077I

C Comment: Bison must be protected from contracting brucellosis from cattle, given that bison first contracted brucellosis from cattle. Others stated that claims of bison having contracting brucellosis from cattle are "skew and innuendo" of facts.

Response: It is considered very likely that brucellosis in wildlife in the Greater Yellowstone Area originated with transmission from domestic livestock. According to the NAS report (1998), the historic presence of numerous herds of free-ranging domestic livestock throughout the west makes it likely that brucellosis was originally transmitted to bison and other wildlife during that time. Meagher and Meyer (1994) state that transmission from cattle to bison probably occurred multiple times, and the distribution of *B. abortus* in the Greater Yellowstone Area and the presence of more than one strain indicate multiple exposures in elk as well (Thorne et al. 1991). Brucellosis in Yellowstone bison is likely to have originated with domestic cattle pastured at various locations throughout the park early in its history (Meagher and Meyer 1994), although it has been suggested that brucellosis may have entered the population with bison imported in 1902 to augment the park's small, declining bison population. Because all of the cattle herds in the Greater Yellowstone Area are free of brucellosis, while *B. abortus* is known to exist in both the Yellowstone and the Jackson bison herds, as well as in some Greater Yellowstone Area elk, it is not possible for the uninfected cattle to transmit brucellosis to wildlife already exposed to the bacteria through contact with other wildlife.

Representative Comment: 4558B

Issue 3: *Brucellosis Effects on Bison*

A Comment: The *Draft Environmental Impact Statement* does not address the impact of brucellosis on the gene pool of the Yellowstone herd.

Response: In order for brucellosis to alter the gene pool of the Yellowstone population, the disease would have to change the reproductive success or survival of specific bison in a nonrandom fashion, thereby favoring particular types of individuals over others on a population-level scale. This has not been demonstrated in the Yellowstone population, which appears to have maintained greater genetic diversity than most other bison populations (Wilson and Strobeck 1997). Because "substantial fetal loss or infertility has not been reported for the bison populations" (Olsen et al. 1998), it is not likely that brucellosis has exerted any influence on the Yellowstone bison gene pool. The bison population in Yellowstone National Park has continued to increase despite the presence of the *B. abortus* bacteria (NAS 1998), indicating that the presence of brucellosis in Yellowstone bison does not appear to have a noticeable effect on population dynamics (please refer also to 3B below).

One potential impact, however, of brucellosis on the genetics of the Yellowstone bison population is through management removal of selected individuals based on seroprevalence status, which has the potential to remove entire matrilineal lineages. Such management may also remove specific age and sex classes of bison (P. Gogan, USGS-BRD, unpubl. data), resulting in a skewed age and sex structure that could decrease effective population size and cause nonrandom genetic mixing (Schneider 1997b). Please refer to "Bison: Population" in this volume for more information on the potential impact of management actions on population genetics.

Representative Comment: 7485C

B Comment: The *Draft Environmental Impact Statement* needs to discuss the impact of infertility and abortions on the Yellowstone herd, because the NAS report (1998) states that brucellosis reduces males' desire and ability to breed. Others stated that brucellosis has not hurt the bison, citing the fact that few abortions have been observed, and the herd has increased in number. Others pointed out that chronically infected herds have a lower rate of abortion, possibly because of naturally acquired immunity.

Response: Evidence exists that bull bison may develop orchitis, epididymitis, and seminal vesiculitis when infected with *B. abortus* (NAS 1998). In bison herds in northern Canada, these and other symptoms may reduce the ability of some males to breed (Tessaro 1987). Sample sizes from the Greater Yellowstone Area and surrounding areas demonstrating physical manifestations of *B. abortus* infection have been relatively small. Few or no data exist to indicate whether brucellosis may be impairing the breeding ability of Yellowstone bison males. However, it appears that the presence of bacteria has not affected the population as a whole: although 57% of male bison sampled in 1996–97 cultured positive for brucellosis (NAS 1998), the population has been growing at a relatively high rate since release from artificial control in 1968. Recent research on female bison in Yellowstone National Park has documented four reproductive failures in which *B. abortus* was cultured from fetal or other remains at the site, although causation has not been proven in these cases (K. Aune, Montana Fish, Wildlife and Parks Commission, pers. comm.). No other documentation exists regarding the frequency of brucellosis-related abortions in the Yellowstone bison population. The bison population in Yellowstone National Park is considered chronically infected; the NAS report refers to work done by Olsen et al. (1998), stating that "immune responses from natural infection might induce some degree of protection against *B. abortus*, inasmuch as substantial fetal loss or infertility has not been reported for the bison populations in the Greater Yellowstone Area."

Representative Comment: 7485C

C Comment: Arthritis, bursitis, lameness, and orchitis all occur as a result of brucellosis and are debilitating to individual bison, and the presence of brucellosis in the bison population violates animal welfare concerns.

Response: Reports and observations of lame or apparently ill bison can be attributed to a number of causes (e.g., fighting injuries, car strikes, natural injuries), in addition to possible brucellosis effects; without collecting appropriate samples from the affected animal it is impossible to assign cause. Diseases of all kinds are present in every wildlife population. Disease in wildlife populations is not an animal welfare issue.

Representative Comment: 9122F

D Comment: The NAS report (1998) states that "Experimental studies show that bison are more susceptible to brucellosis than cattle or elk; nearly all aborted their first calf." The *Draft Environmental Impact Statement* should address this issue.

Response: The quote refers to an experimental situation in which bison more than four months pregnant were given a standard bovine challenge dose of *Brucella*. Bison were demonstrated to be at least as susceptible to challenge and consequent abortion as cattle (Davis et al. 1991). The results of this study indicate that bison and cattle can both be infected with and affected by brucellosis, but it is not clear whether these experimental results indicate similar susceptibility under natural conditions. Olsen et al. (1998) noted that "substantial fetal loss or infertility has not been reported for the bison populations" in the Greater Yellowstone Area. The Yellowstone bison population is considered to be chronically infected, and according to the NAS report, chronic infection "implies a substantial degree of immunity in many individuals that blunts the course of disease and allows calves to clear *B. abortus* from their bodies before they reach sexual maturity." While some calves inherit immunity from their mothers, other immunologically naïve female calves could become infected later in life and could carry *B. abortus* into their first pregnancy and abort (NAS 1998).

Representative Comment: 14642F

Issue 4: ***No Brucellosis Eradication from the Yellowstone Herd***

A Comment: The agencies should not attempt to eradicate brucellosis from Yellowstone bison because unethical management methods would be required.

Response: Although one objective of a management plan is to "commit to the eventual elimination of brucellosis in bison and other wildlife" (DEIS, p. 29), the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope" of the management plan.

Alternatives 5 and 6 contain elements that more rapidly reduce seroprevalence in bison, employing more lethal management actions that significantly reduce the bison population and may have adverse impacts on other wildlife species. The agencies are committed to carrying out all management actions in as humanely a fashion as possible (see DEIS, p. 56–7; and in this volume "Bison: Humane Treatment of Bison").

Representative Comment: 8626C

B Comment: It is impossible to eliminate brucellosis from Yellowstone bison for various reasons, including the facts that sufficient information and technical capability are not available to accomplish eradication.

Response: As noted above, elimination of brucellosis from the bison herd is not an objective of this plan. One reason is that the presence of brucellosis in elk in other portions of the Greater Yellowstone Area would likely result in eventual reinfection of the Yellowstone bison population (NAS 1998). Technical and logistical limitations, as noted in the comment, are also potential barriers to eradication.

Representative Comment: 10319AC

Issue 5: ***Disease Prevalence in the Yellowstone Herd***

A Comment: A low percentage of bison in the Yellowstone population actually carries the disease. Other commenters stated that testing is unreliable and overestimates the actual number of bison with brucellosis, resulting in the killing of nondiseased animals.

Response: The NAS (1998) report stated that a seropositive test response will "provide a strong indication of whether an individual animal is infectious." Recent research has shown, however, that *B. abortus* bacteria can be cultured from approximately 46% of bison that test positive for exposure to brucellosis in serologic tests (Roffe et al. 1999). Evidence shows that approximately 35%–50% of the population test seropositive, so these results suggest that at least 16% of the population may actually harbor *B. abortus* bacteria. Please see the discussion on serology and culture in volume 1, "Affected Environment: *Brucella Abortus* in Yellowstone Bison." Negative results, however, also do not equate with the absence of infection (NAS 1998). See "Bison: Brucellosis Testing" and "Brucellosis Transmission and Public Perception" in this volume for more information. Research is underway to develop more accurate field testing techniques for bison (see volume 1, appendix D, for a list of current and proposed research).

Representative Comment: 8650D

B Comment: Why do some alternatives call for the removal of seronegative pregnant females. Information should be provided as to the actual seroconversion rate or probability of seroconversion, and the fate of calves born to these bison.

Response: Although the commenter is correct that some alternatives call for the removal of seronegative pregnant bison, it is important to note that the modified preferred alternative does not.

According to the NAS report (1998), female bison can be infected with bacteria in nonreproductive tissues (e.g., lymph glands) at such low numbers that antibodies are not produced in sufficient quantity to be detected by standard serologic tests. Pregnancy may stimulate *B. abortus* to replicate and infect the reproductive tract, and when this occurs, these bison are assumed to have a "high likelihood" of shedding *B. abortus* (NAS 1998). The percentage of female bison in Yellowstone with such latent infections is unknown, as is the percentage of females that will actually seroconvert or the rate at which they might do so. Research is currently underway that may provide some information on this issue in Yellowstone bison (see volume 1, appendix D, for a list of current and proposed research topics). Regardless of the rate of seroconversion, however, all alternatives in the *Draft Environmental Impact Statement* emphasize spatial and temporal separation of bison and cattle to reduce the risk of transmission.

Representative Comment: 14819YY

Issue 6: *Risk Management*

A Comment: The agencies should sterilize female bison that are capable of transmitting brucellosis.

Response: The *Draft Environmental Impact Statement* addresses some of the difficulties in considering contraception or sterilization as a population control technique (see DEIS, p. 40). Similar difficulties are anticipated in attempting to use sterilization as a risk management technique. Aside from uncertainties as to effectiveness, "significant behavioral changes can be expected for all major contraceptive agents currently under investigation" (Garrott 1995). Contraceptive agents could disrupt family and social bonds and extend or alter breeding and, therefore, birthing seasons (Garrott 1995). Furthermore, the technology does not currently exist by which to effectively administer contraceptive agents to free-ranging populations of large mammals (Garrott 1995). The need for an optimum combination of available animals to treat, the proportion of animals that can be successfully treated, and the efficacy of the method used is likely to render currently available techniques relatively ineffective in a free-ranging population spread over a large, geographically varied area (Garrott 1995). Furthermore, targeting young, reproductive females, which are the animals most likely to be infectious (Roffe et al. 1999), could have serious impacts on population numbers and composition. For these reasons, this method has not been considered further as a means for limiting bison population size or for managing transmission risk.

Representative Comment: 13442D

Brucellosis Testing (BI-23)

Issue 1: ***Relationship of Testing to Lethal Control***

A Comment: Only known seropositive bison should be killed. It is appalling how many bison are killed without being tested or with negative test results. Even calves were killed without being tested.

Response: To date in the recent past, all bison (including seronegative adults or calves) crossing Yellowstone National Park's northern boundary at Reese Creek have been captured and sent to slaughter or shot. This is because a private, year-round cattle operation exists to the north, and the agencies have been asked to remove bison from this land. Because no quarantine or other holding facilities for bison are available, removal through shipping to slaughter or shooting has been the only choice. This is why several alternatives (3, 4, 7, and the modified preferred alternative) include provisions for quarantine; alternatives 2, 3, and the modified preferred alternative include the purchase of easements or land to the north of the park. This would allow the agencies to send only seropositive bison to slaughter and to release or quarantine seronegatives. On the west side alternatives explore all options, from no capture of any bison, to the release of all seronegative bison, to the release of all except pregnant seronegative bison, to capture or shooting of any bison outside the park. The special treatment of pregnant bison is related to the long and variable incubation period of brucellosis. Nonpregnant females in particular may test negative, but may actually be incubating the bacteria at low numbers in lymph glands. The bacteria are then stimulated by hormones produced during pregnancy. Because they are also able to discharge bacteria into the environment through abortion or live birth, this class of bison is considered to pose a higher risk of transmission. Although these alternatives focus primarily on logistics and risk in determining which classes of bison would be shot or sent to slaughter, seronegative bison could also be subject to lethal control as the bison population level approaches the upper limit proposed in an alternative, e.g., alternative 7.

Representative Comment: 2014C

B Comment: The inaccuracy of blood tests means bison will continue to be slaughtered. Buffalo should not be killed unless there is definite proof that the animal being killed has *brucellosis*.

Response: A battery of blood tests is used when testing bison for brucellosis. Because the tests detect antibodies, not living bacteria, serologic tests are indirect evidence of infection. The presence of antibrucellar antibodies in the serum of an animal indicates exposure to the bacteria and the possibility that infection is present. Any seropositive test in the field or in the laboratory is sufficient to classify a bison as a reactor. The agencies assume, as is recommended additionally by the NAS report (1998), that "because of testing insufficiencies, seropositive bison should be assumed for management purposes to be carrying live *B. abortus*."

Representative Comment: 173B, 3812A, 5545E

C Comment: Why are all buffalo being killed if only a portion of the herd is infected?

Response: Not all the buffalo would be killed under any alternative. One of the goals of the management plan is to maintain a viable free-roaming bison population. Depending on the particular alternative, however, some bison would be subject to lethal control under certain conditions. Those conditions vary greatly. For example, under alternative 2 there would be very little use of lethal control, especially in phase 2. In contrast, under alternative 7 some bison would be subject to lethal control after capture and testing, unsuccessful hazing, or to prevent the population from exceeding the upper limit. In some alternatives seronegative pregnant bison could be killed because they may be harboring the organism, yet test negative for antibodies. Unfortunately no test is currently available that can determine with absolute certainty that a bison is not harboring *B. abortus.*

Representative Comment: 14737B

D Comment: Testing can help reduce the number of bison that will be killed.

Response: Testing can help reduce the number of bison killed by allowing the release of test negative animals under certain circumstances and by potentially allowing for the relocation of some of these bison if a quarantine facility is used in the future.

Representative Comment: 194E

E Comment: The Department of Livestock should be fined for not following the original plan of testing the animals to determine who was healthy, and who was to be "hauled to slaughterhouses and butchered."

Response: The Montana Department of Livestock is very closely following the *Interim Bison Management Plan*.

Representative Comment: 7831E

Issue 2: *Relationship of Testing to Quarantine*

A Comment: Why would seronegative bison be sent to quarantine, especially when they cannot transmit the disease? There is no biological reason for that unless the test is flawed and a false negative reading is found. In that case a better test needs to be developed.

Response: Brucellosis has a highly variable incubation period, which is the time between when an animal is exposed to the disease, and when the disease is detected either through blood testing or by observing clinical signs. This period may be as short as a few weeks, and it may be as long as several years. During this incubation period, an animal will have a negative blood test. Therefore, one negative blood test on an animal that has recently been exposed to the disease is not sufficient to ensure that the animal is not infected. For this reason, seronegative animals must be removed from possible exposure to the disease and must be tested several times over a fairly lengthy time frame to ensure that they are truly free of disease. It is only seronegative bison that are eligible for quarantine, as they would be released to appropriate recipients when they have completed the quarantine protocol, and so must be disease free. See "Bison: Quarantine Operations" for more information.

Representative Comment: 14440G, 186G

Issue 3: *Tissue Testing*

A Comment: Only bison that are tissue positive for brucellosis should be slaughtered; the tissue can be obtained by muscle biopsy when the bison are corralled or tranquilized. Biopsies can be taken from bison and elk.

Response: The *B. abortus* bacteria do not reside in muscle tissue of infected animals. The organism resides in certain lymph nodes and sometimes in the reproductive organs of infected animals. Therefore, muscle biopsy is an ineffective method of culturing for *B. abortus* in bison or elk. Biopsies of lymph nodes are also impractical. The organism may be located in only a small part of the lymph node and the likelihood of a biopsy needle collecting that exact piece is low. Furthermore, the lymph nodes most likely to harbor the organism are either extremely difficult or impossible to biopsy in bison.

Representative Comment: 102C

B Comment: Rapid tissue testing could use fluorescent antibody methods.

Response: Fluorescent antibody testing would depend on the presence of the bacteria in the tissue being tested, similar to culturing. The difficulties that apply to tissue sampling for culture apply to tissue

sampling for fluorescent antibodies. Fluorescent antibody testing would be more efficient with viral diseases or if a large number of bacteria are present.

Representative Comment: 102H

C Comment: The final plan should include "culture ... testing of all carcasses."

Response: As noted above, serologic tests are indirect evidence of infection, and so there are some false positive results. The correlation between serology and the ability to culture *Brucella* bacteria is well below 100% due to a number of factors such as individual animal variation and culture technique (see volume 1, "Affected Environment: *Brucella Abortus* in Yellowstone Bison"). State and federal animal health authorities and private industry are always looking for better tests and would likely welcome any promising research. Researchers are currently evaluating serological tests such as enzyme-linked immunosorbent assay and fluorescence polarization assay; some are also evaluating DNA tests for detecting *B. abortus* in blood and other tissues.

Representative Comment: 194E

Issue 4: *Blood Testing*

A Comment: The final plan should include "investment in the development of more effective tests than the present serology procedure (which tends to identify a large number of false positives). The blood test currently used to diagnose the disease in bison is unreliable. A better test needs to be developed before testing can even be considered.

Response: As noted above, serologic tests are indirect evidence of infection, and so there are some false positive results. The correlation between serology and the ability to culture *Brucella* bacteria is well below 100% due to a number of factors such as individual animal variation and culture technique (see volume 1, "Affected Environment: *Brucella Abortus* in Yellowstone Bison"). State and federal animal health authorities and private industry are always looking for better tests and would likely welcome any promising research. Researchers are currently evaluating serological tests such as enzyme-linked immunosorbent assay and fluorescence polarization assay; some are also evaluating DNA tests for detecting *B. abortus* in blood and other tissues.

Representative Comment: 194E, 13472L

B Comment: The final plan should include "serology testing of all carcasses." Bison that are shot should be blood tested to provide information on herd status.

Response: Virtually all carcasses are blood tested currently. It is anticipated that this will continue in the future as well.

Representative Comment: 5384B

C Comment: Serology tests exposure to brucellosis, not infectiousness. I believe disease exposure can promote brucellosis resistance, resulting in a stronger and healthier herd. The herd segment resistant to brucellosis should be promoted, not destroyed. In fact, less than half the seropositive bison are infectious.

Response: It is true that blood tests detect antibodies produced in response to an antigen (the *Brucella* bacteria), and so are indirect evidence of infection. However, those animals that are resistant would be seronegative and would not be destroyed. For additional information, see "Bison: Brucellosis in Yellowstone Bison Herd" and "Brucellosis Risk Management" in this volume.

Representative Comment: 5635D

D Comment: Current seropositivity tests SHOULD NOT decide the fate of the buffalo.

Response: Seropositive animals are sent to slaughter, as there is no practical, effective treatment for brucellosis in livestock. See responses to issues 1B, 2A, and 4A above for information on the reliability of blood tests in determining infection.

Representative Comment: 9018D

E Comment: The blood test was designed for cattle, not for bison.

Response: As noted in the environmental impact statement (see volume 1 "Affected Environment: Bison Population — *Brucella abortus* in Yellowstone Bison"), serological tests used on bison in Yellowstone were developed for cattle. Recent research on seropositive bison from Yellowstone has shown that the correlation between seropositive animals and presence (culture) of the bacteria was 46% (Roffe et al. 1999). Isolation of B. abortus on bacterial cultures correlates well with high serological responses; that is, bison infected with large numbers of bacteria typically have high serologic titers.

Representative Comment: 15078B

F Comment: False positives can occur for several reasons, such as:
- cross-reacting antigens
- defective test procedures
- in the recovery phases in young animals that have no live bacteria.

Response: Cross-reacting antigens may cause some of the tests to be positive, but that occurs in only a small percentage of animals in an affected herd. Defective test procedures are highly unlikely to occur. State and federal laboratories have quality control procedures such as periodic recertification to ensure that there are no defective procedures. Persons conducting serological tests in the field are tested and certified to conduct those tests. It is not possible with current technology to evaluate the possibility of false positives "in the recovery phases in young animals that have no live bacteria" because, other than a positive culture, there is no test that can indicate conclusively whether or not an animal is harboring *B. abortus*, regardless of the serological test results. Thus, it is not possible to determine conclusively that a young animal — or any other animal — has no live *Brucella* bacteria.

Representative Comment: 14819J

G Comment: If bison must be tested, they should be tested in the field, not in laboratories; they are less at risk of testing-related infections in the field than in a laboratory.

Response: Bison that are captured in the Greater Yellowstone Area are initially field tested with several tests. The blood from these animals is then transported to a laboratory for further testing. The testing in the lab repeats the tests that were run in the field and includes several additional, complex tests that cannot be performed in the field. Testing-related infections in the laboratory do not occur.

Representative Comment: 175F

Issue 5: *Support for Testing*

A Comment: Testing, along with other techniques, could be implemented without delay to control and eliminate this disease in the bison and to keep bison and elk brucellosis free.

Response: Serological testing, along with pregnancy testing and slaughter, are in use now under the *Interim Bison Management Plan*. Testing along with other techniques such as vaccination, pregnancy testing, slaughter, and quarantine are proposed in various combinations in different alternatives.

Representative Comment: 11057B

B Comment: The testing of buffalo for brucellosis will ensure that livestock will be protected.

Response: The alternatives primarily rely on spatial and temporal separation of bison and potentially infectious birth materials from susceptible cattle to ensure that livestock are protected. The testing and removal of seropositive bison that migrate out of the park would decrease the possibility that infectious birth materials would be left behind as bison return to Yellowstone National Park in the spring, but are not adequate to protect cattle by themselves.

Representative Comment: 15168AD

Issue 6: ***Opposition to Testing***

A Comment: Some commenters stated their opposition to testing bison without giving specific reasons.

Response: These comments are duly noted; however, specific responses can not be given without specific comments.

Representative Comment: 9528A

B Comment: Precious money should not be wasted on bison brucellosis testing.

Response: We believe money should be spent on such testing. Testing can help reduce the number of bison killed by allowing the release of test negative animals under certain circumstances and by potentially allowing for the relocation of some of these bison if a quarantine facility is established in the future. It is part of all alternatives except phase 2 of alternative 2, and step 3 of the modified preferred alternative.

Representative Comment: 195F

C Comment: Please stop testing the bison — help cattlemen protect their cattle vs. controlling the bison.

Response: Every alternative has measures to protect Montana cattle in the impact area from the possibility of brucellosis transmission by bison. Some focus on controlling bison to a greater extent and some on controlling cattle operations; however, each is geared to "help cattlemen protect their cattle" while at the same time maintaining a wild and free-ranging population of Yellowstone bison. Testing is integral to some alternatives and is a measure used to prevent seropositive bison from leaving the park, where they could pose some risk of environmental contamination on lands where cattle would graze in the summer.

Representative Comment: 4119D

D Comment: As an alternative, simply monitor the cattle in the area to see if they can even get brucellosis.

Response: There is no question that the cattle can get brucellosis. Standard surveillance, such as blood testing of all test-eligible slaughtered cattle, is ongoing to detect if any of the cattle have contracted brucellosis. However, if transmission to one cow occurs, she may test negative and be transported out of the state or to another location in the state while incubating the disease. Since surveillance for brucellosis in class-free states does not routinely occur, the disease could spread under this scenario, causing large-scale economic impacts to monitor and control the outbreak, as well as to regain class-free status if it was revoked (see volume 1, "Environmental Consequences: Impacts on Socioeconomics," and in this volume, "Socioeconomics: Cost to Livestock Operators" for more information). This is why prevention, rather than control of an outbreak, is the focus of the plan.

Representative Comment: 8870E

E Comment: The use of capture, test, and slaughter facilities as the primary means of limiting the herd's access to off-Yellowstone land puts the blame on the buffalo.

Response: No "blame" is being put anywhere. Some bison are infected with brucellosis, and they must be prevented from transmitting the disease to domestic cattle. Spatial and temporal separation of bison and cattle is a primary means of preventing transmission. Other management measures of capture, testing, and sending seropositive animals to slaughter provide additional means of preventing transmission of brucellosis to cattle. Except for alternative 5, alternatives that employ capture, test, and slaughter do allow some bison on public lands outside Yellowstone National Park.

Representative Comment: 7068C

Issue 7: ***Testing All Montana Cattle***

A Comment: Cattle from Montana are not presently tested. All cattle should be tested before crossing state lines.

Response: Because Montana is classified as a brucellosis class-free state, cattle are not required by APHIS to have a negative blood test before crossing state lines, although Idaho requires testing of cattle that have been pastured in the West Yellowstone area. Many Montana cattle, i.e., bulls and cows over two years old, are also being tested through blood samples collected at slaughter as part of the brucellosis surveillance program. Also, diagnostic investigations of cases of abortion in Montana cattle include a test for brucellosis.

Representative Comment: 238E

B Comment: Cattle should all be tested before delivery to market, instead of testing and slaughtering Yellowstone National Park bison.

Response: Because Montana is classified as a brucellosis class-free state, cattle are not required to be tested either before they go to market or at the market. In addition, the cost to test all Montana cattle moved out of state each year would range between $5.1 million and $16.3 million statewide (see "Socioeconomics: Cost to Livestock Operators" in this volume for more information). Additional economic consequences could result if the state lost its class-free status, should transmission to cattle occur.

Representative Comment: 664E

Issue 8: ***Testing Cattle in the Conflict Zone***

A Comment: Cattle in the conflict zone should be tested before leaving the area. APHIS should pay for the testing.

Response: Because Idaho, Montana, and Wyoming are classified as brucellosis class-free, cattle are not required by APHIS to be tested before leaving the area. However, cattle in the area are tested as part of the brucellosis surveillance program. This testing program includes blood samples taken at slaughter.

Representative Comment: 10692G

B Comment: Remove bison at landowner expense and test susceptible cattle.

Response: All alternatives include elements to maintain separation of bison and cattle. If the commingling of bison and cattle occurs in spite of efforts to prevent it, the bison would be removed, and the cattle would be tested. The agencies do not intend for landowners to sustain the expense of removing the bison.

Representative Comment: 271C

C Comment: If cattle owners want to graze their cattle on public lands where bison would occur, they must agree to have their cattle quarantined and tested.

Response: The U.S. Forest Service, which oversees grazing allotments on public land, does not have the authority to quarantine and require a test. However, if it is determined that bison have commingled with a cattle herd, the states are requiring that the cattle herd be tested. If actual exposure to bison has occurred, the state may place the herd under quarantine pending a test. Currently, Idaho requires testing of bison grazed on allotments in the West Yellowstone area both before the bison leave Montana in the fall and before they return in the early summer.

Representative Comment: 1090C

D Comment: If necessary to ensure free interstate trade, annually test the few cattle herds within the conflict zone to ensure they remain brucellosis-free (APHIS should pay for the testing as they do elsewhere).

Response: Because Idaho, Montana, and Wyoming are classified as brucellosis class-free by APHIS, cattle in those areas are not required by APHIS to be tested regularly or before or after interstate shipment, as they are tested at slaughter for surveillance. However, if it is determined that a cattle herd has been exposed to bison, the states are requiring that those herds be tested. APHIS has been funding this testing.

Representative Comment: 10475AE

E Comment: Existing surveillance systems at livestock markets and slaughtering facilities, in addition to potential testing of animals that may come in contact with bison, would appear to be sufficient to detect infection if it were to occur.

Response: The commenter is correct that, if contact and transmission should occur, the disease could travel and spread before being detected because of the possibility of a prolonged incubation period. However, bison and cattle are kept separate, both spatially and through the use of a time period to ensure the absence of environmental contamination. Other measures, such as capture, test, slaughter, hazing, quarantine, vaccination, and confining bison to prescribed areas where cattle are not present, would reduce risk further. Surveillance at markets or slaughtering facilities is, therefore, not required. If contact between bison and cattle in the impact area does occur, surveillance and possible quarantine of the specific cattle herd are likely, as described above.

Representative Comment: 14714O

F Comment: Any cattle herd that cannot be certified brucellosis free should not be permitted to graze on public land.

Response: Montana is currently classified as a class-free state. As a note, it is also possible for cattle herds to be individually assigned brucellosis-free status. To qualify, a herd must periodically test negative for brucellosis, as specified in 9 CFR 78. This status is valid for 12 months unless evidence of brucellosis is disclosed in the herd .

Representative Comment: 1124C

Issue 9: ***Testing and Brucellosis Eradication***

A Comment: Brucellosis in bison should be eradicated through aggressive testing of bison, destruction of diseased bison, and vaccination of brucellosis-free bison to prevent the disease.

Response: Eradication of brucellosis is not an objective of this planning effort. However, alternatives 5 and 6 use an approach similar to the one described to manage the risk of transmitting the disease from bison to cattle.

Representative Comment: 2029E

B Comment: To clean up brucellosis, the government should have to test and retest as is required for cattle.

Response: The most effective nonlethal means of "cleaning up" brucellosis in the herd would be through vaccination with a safe and effective vaccine. The procedures used to rid a cattle herd of brucellosis are unacceptable for this unique wild and free-ranging population of bison. However, alternatives 5 and 6 include "testing and retesting" of the entire bison herd.

Representative Comment: 5246B

Issue 10: ***Disposition of Seronegative Bison after Testing***

A Comment: Seronegative bison captured on private property could be transferred to other areas more "conducive" to their needs.

Response: Due to the potentially lengthy incubation period of brucellosis, a single test does not ensure that an animal is free of disease. Therefore, before relocating seronegative bison, it is necessary to quarantine and retest negative animals to ensure that they are not incubating the disease, which would result in testing positive at a later date. A proposed quarantine facility is a method of housing these animals through this testing period. Once bison are certified as being free of brucellosis, they could be released to Native American tribes, parks, preserves, or other appropriate recipients. If these bison were transported back into Yellowstone National Park or to other appropriate public lands, quarantine and further testing would not be needed.

Representative Comment: 1862D

B Comment: Bison free of the disease could be vaccinated and tagged, and released, posing no further danger to domestic cattle.

Response: This procedure is followed now for some seronegative bison in the western boundary area and is part of several alternatives. However, bison in this SMA are returned to the park in the spring or early summer to ensure that they have not seroconverted and contaminated the environment before cattle return. For bison to be released onto lands other than SMAs or inside Yellowstone National Park boundaries, they would first need to complete the approved quarantine protocol, which may include vaccination, before they could be declared disease free. (See "Bison: Quarantine Operations" in this volume for more information).

Representative Comment: 1572555E

C Comment: The bison should be separated out, tested for the disease, and then vaccinated and sent back to where they had been picked up in the wild.

Response: This is similar to the process described for alternative 5 and phase 2 of alternative 6, although bison would simply be released from capture facilities in Yellowstone National Park back into the park in both alternatives.

Representative Comment: 8739B

Issue 11: ***Disposition of Seropositive Bison after Testing***

A Comment: Slaughter the "positive carriers."

Response: In every alternative that includes testing, seropositives are sent to slaughter.

Representative Comment: 8826A

B Comment: The infected animals could be sold or moved to private lands.

Response: Bison that test positive could not be transported under existing rules except to approved slaughter or research facilities. The release of such animals anywhere besides Yellowstone National Park or SMAs would risk exposure to cattle and the reintroduction of brucellosis. Also, there is no treatment for brucellosis, so infected bison cannot be cured. Therefore, for those alternatives where testing of bison could occur, all seropositive bison would be sent only to slaughter, and not sold or transported to private lands.

Representative Comment: 6157B

C Comment: Bison captured on private land and carrying brucellosis could be killed, treated or transported to tribal lands or zoos.

Response: There is no practical, effective treatment for brucellosis in livestock. Infected animals must be considered as having a high probability of transmitting the disease to negative animals or potentially to humans. These animals should not be moved to private lands or zoos, as they may cause the disease to spread in new, previously clean communities. Furthermore, interstate shipment of reactor or exposed bison is permitted only to recognized slaughtering facilities or other approved destinations under existing federal regulations. Brucellosis is almost eliminated in the United States. It would be imprudent to move these animals out and possibly reinfect states or areas.

Representative Comment: 6197B

D Comment: Bison testing positive could go to research facilities for studies to develop tests that will distinguish between contagious and noncontagious bison.

Response: Some seropositive bison from Yellowstone National Park have been transported to research facilities so that the disease may be studied more in this species. It is expected that this will continue.

Representative Comment: 8180B

Issue 12: ***Inaccurate Information in the Draft Environmental Impact Statement***

A Comment: There is an inaccuracy in the *Draft Environmental Impact Statement*, p. iv: "The only sure way to know if an animal had the disease is to slaughter it and culture tissues from several locations for bacteria." There is a similar statement on p. 17. Actually, *B. abortus* can also be isolated from milk or udder secretions, biopsy of lymph nodes and culture of reproductive tract exudates or discharges from live animals, and from fetal and placental materials at the time of abortion or calving.

Response: The comment is correct. The final environmental impact statement text has been changed to reflect the correct information.

Representative Comment: 9364JJ

B Comment: There is misleading information in the *Draft Environmental Impact Statement*, p. iv: "In Yellowstone bison, agencies have used a blood test for the presence of *Brucella* antibodies. For a number of reasons, these blood tests tend to overestimate the number of bison actually harboring the bacteria. Difficulties in isolating the bacteria from tissues and other factors have also meant fewer positive culture tests than the number of infected bison." Comment: It is common to obtain fewer positive culture tests than the number of infected animals in cattle as well. This is not a phenomenon that should cause doubt on the diagnosis of brucellosis in the Greater Yellowstone Area. The ability to culture *Brucella* is significantly related to the sampling, handling, shipping and culturing technique, and is dependent upon *Brucella* being present for culture in the sample collected.

Response: The comment is correct. The federal environmental impact statement text has been changed to reflect the correct information.

Representative Comment: 9364KK

C Comment: Statements regarding transmission in the *Draft Environmental Impact Statement* p. v: "It is possible that, although brucellosis may be endemic in the Yellowstone area bison herd, few of the animals are capable of transmitting the disease. This suggestion is supported by noting the discrepancy between the number of bison that test seropositive for brucellosis but are culture tissue negative." Comment: The evidence of approximately 50% seropositive bison in the area strongly indicates that transmission is occurring. As discussed previously, culture technique has a direct effect on the ability to isolate the organism. Culture positive animals are themselves infected with the organism and are very likely to transmit the disease when the organism is located in the reproductive tract. However, culture status alone is not a direct indicator of ability to transmit the disease. Seropositive animals, especially those with very high titers, may be harboring the organism as well, yet may be culture negative if the organism is in insufficient numbers at the location cultured, or if culture technique is such that isolation is not likely.

Additional comments address virtually the same statements made on p. 20 of the *Draft Environmental Impact Statement*: "It is possible that, although brucellosis may be endemic in this bison herd, few of the animals are capable of transmitting the disease. This suggestion is supported by noting the discrepancy between the frequency of seropositive animals in samples collected at various times since 1917 and the frequency of culture positive animals in samples of tissues collected during 1991–92 to determine the presence of *B. abortus*." Comments noted the following sentences, which explain that technical difficulties make *Brucella* isolation difficult from tissues, causing recovery rate to be lower than seroprevalence suggests. All seropositive bison should be considered positive, as a negative culture does not prove absence of the organism. Comments note that the same is true for cattle. They point out that tissues from 12 (37.5%) of 32 seropositive female bison were culture positive. They then cite a number of supporting statements from the NAS study (1998).

Response: The information noted in the comment is already well represented in volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison" (subsections "What is Brucellosis?" "Brucellosis Transmission," "Brucellosis Diagnosis," and "Risk of Transmission"). These sections present what most researchers believe about the epidemiology and pathology of brucellosis in bison. However, the pages cited in the comment refer to the section "Alternative Interpretation of Risk." This section is devoted to theories or studies that result in conclusions outside mainstream scientific thought.

Representative Comment: 9364KK

Issue 13: ***Correlation between Brucellosis Serology and Culture***

A Comment: The *Draft Environmental Impact Statement* does not include data on the number of culture positive bison killed during the winter of 1996–97. Data from these bison are needed to evaluate the correlation between serology and culture results. The commenter suspects the data are being withheld by APHIS.

Response: These data were being compiled at the time the *Draft Environmental Impact Statement* was printed and were not yet available. The data compilation was recently completed, and all culture data collected from the spring of 1995 through the spring of 1998 are published in the final environmental impact statement.

Representative Comment: 14819Q

B Comment: APHIS and Department of the Interior scientists must continue to examine the relationship between blood test-positive bison and culture-positive bison for any and all bison killed from management actions.

Response: The continued collection of paired blood and tissues for serology and culture data comparison is being considered and will be done if it is decided that the data to be collected will be useful in making further management decisions or if the data are needed to fill current information gaps.

Representative Comment: 14819OO

C Comment: A simple risk assessment based on existing blood and tissue results would indicate that less than one female bison in the entire population is even capable of potentially transmitting the disease.

Response: The risk of transmission cannot be determined with precision based on current knowledge, and is considered too small to be measured accurately in any case (NAS 1998). Despite the commenter's estimate, most of the variables that define risk are unknown. The risk of transmission in cattle is determined largely by the number of abortions or infective calvings that occur, the presence and survival of the bacteria in the placenta or birth products, and the exposure of a susceptible host. The possible exposure of a susceptible host also requires knowledge of cattle and bison behavioral interactions in the wild; this is also nearly completely unstudied and unknown. Even the number of culture-positive bison in a given set of seropositive animals changes from study to study. (See volume 1, "Affected Environment: Bison Population — *Brucella Abortus* in Yellowstone Bison.") Therefore, the agencies cannot verify or refute the claim made by the commenter.

Representative Comment: 15214B

D Comment: The serological tests used for bison were originally developed for cattle. Seroprevalence and presence of the bacteria is highly correlated in cattle, but evidence suggests that such is not the case for bison.

Response: Although initially developed for use in the cattle brucellosis eradication program, the battery of serologic tests that are used has been proven to be efficacious for use in bison. Recent evidence indicates that the discrepancy between serological-positive and culture-positive bison is similar to that in chronically infected cattle populations (Roffe et al. 1999).

Representative Comment: 15874AS

E Comment: There is a lack of correlation between serology and culture results. The consequences of this lack of correlation should be disclosed to the public, i.e., there is no assurance that bison testing positive for the disease: (a) have ever had the disease and most importantly, (b) that there is no way of knowing that bison testing positive actually are infected or contagious for brucellosis.

Response: While there is not 100% correlation between brucellosis blood tests and positive cultures, there is correlation similar to that in a chronically infected cattle herd. In a recent study of serology and infection in Yellowstone bison, 11 of 27 seropositive, adult female bison were culture positive (Roffe et al. 1999). Infection was likely to be found in bison with high titers (concentrations of antibodies) and in younger age classes. Most experts believe the discrepancy between blood and culture positive results is primarily due to the difficulty in culturing bacteria from tissues taken from a chronically infected herd, as

bacteria can exist in individual bison in very low numbers. However, it is also true that some bison may test seropositive for the presence of antibodies and not be infected or infectious (NAS 1998). According to the NAS report, it would be "dangerous" to assume that large numbers of seropositive animals do not carry live *B. abortus*, and this is the policy the agencies have adopted.

Representative Comment: 14819I

F Comment: The *Draft Environmental Impact Statement* states that serological and culture results are not sufficient to determine the risk of transmission. Why would the livestock industry feel its cattle are "safer" if seroprevalence in bison declines?

Response: Although there are some false positive results, there is some correlation between high serologic responses and isolation of *B. abortus* on bacterial cultures. Therefore, seropositive bison present a risk of transmitting brucellosis to other animals. As the seroprevalence level declines, there will be fewer infected animals with the potential of transmitting the disease, thus resulting in a reduced risk to the livestock industry.

Representative Comment: 14819J

Issue 14: ***Miscellaneous Testing Issues***

A Comment: The *Draft Environmental Impact Statement* seems to say that bison testing negative for brucellosis can never get the disease later. Is this true?

Response: No. Some bison are naturally resistant to brucellosis and will repeatedly test seronegative regardless of exposure. However, some that are not infected and test seronegative may later become infected and test positive. It is also possible that some portion of bison testing seronegative are actually incubating the disease at low levels. This incubation period may be as short as a few weeks, and it may be as long as several years. In some female bison the hormones associated with pregnancy can stimulate these incubating bacteria to reproduce, causing an immune response and a seropositive blood test.

Representative Comment: 15078B, 214F

B Comment: The final plan should include seasonal testing for brucellosis.

Response: Under all alternatives that include test and slaughter, except alternatives 5 and 6, bison would be tested only when they leave Yellowstone National Park, as a risk management tool in addition to separating of bison and cattle in time and space. Therefore testing generally occurs in winter and early spring, since that is when bison are most likely to be moving beyond the park boundary. The only alternatives that call for additional testing are 5 and 6. In either, test and slaughter would be used to rapidly reduce seroprevalence in bison by establishing capture facilities throughout the park and attempting to capture and test the entire bison population over a relatively short period of time. These facilities would likely be operated between the months of November and April, when bison are in larger groups at lower elevations, making rounding them up and moving them into capture facilities more feasible. It would be much more difficult to carry out testing operations on a large scale during the late spring, summer, and fall months, when calving activity is occurring, bison are spread out in smaller groups over a larger area, and males are more intractable due to rutting activity. Capturing bison during summer months might also increase the risk of bison deaths due to heat stress. Repeated capture and testing over several seasons would result in an overall increase in bison injuries and deaths.

Representative Comment: 194EXXX

Brucellosis Transmission and Public Perception (BI-24)

Issue 1: ***Risk of Brucellosis Transmission from Bison to Cattle in the Area***

A Comment: The risk of brucellosis transmis sion to cattle is minuscule, and there are only 1,800 cattle in the area.

Response: The commenter is correct that the risk of brucellosis transmission from bison to cattle is small; the NAS report characterizes it as so small it cannot be measured accurately (NAS 1998, p. 117; also see "Bison: Brucellosis Risk Management — Issue 1A" in this volume for more information on the factors limiting the agencies' ability to quantify risk of transmission). It is also true that a relatively low number of cattle occupy the area where bison are likely to winter outside Yellowstone National Park, even in alternative 2 where these areas are the largest of any in the alternatives analyzed (2,019 cow-calf pairs on all public and private land in the analysis area; see DEIS table 17). However, transmission from bison to cattle under confined, experimental conditions has occurred, and the agencies have assumed it could occur in the wild as well. As noted in the NAS report, the risk of transmission is low, but it cannot be assumed to be zero if infected bison are allowed to intermingle with cattle or if environmental contamination is such that transmission could occur.

Although it is true that relatively few cattle occupy the area where bison could graze outside the park, the threat of disease transmission is not limited to just these cows, as brucellosis in cattle has a long incubation period. Accordingly, adult cows contracting the disease from bison could test negative and be exported to another location and possibly infect cattle in another herd. If that occurred, significant economic consequences to Montana such as those described in the *Draft Environmental Impact Statement* (pp. 22–26) and this volume (see "Socioeconomics: Cost to Livestock Operators — Issue 3A") could occur. For this reason, the agencies have emphasized preventing the transmission of the disease to cattle in the impact area. This is achievable through the spatial and temporal separation of cattle and bison — a feature common to all alternatives analyzed. Although cattle and bison may occupy the same land in some cases (such as the Horse Butte allotment in the western SMA), they do so at different times of the year, thus preventing contact.

Representative Comment: Form 63A

B Comment: Isn't it true that the risk of transmission is very small because either cattle and bison are kept separated or births and/or abortions occur at a time or in a place when no cattle are present? If births or abortions do take place on land cattle would eventually occupy, wouldn't the organism be readily killed in the environment by heat, sun, dryness, or geothermal activity, or be destroyed as scavengers consume the aborted fetuses or afterbirth? It seems unlikely that cattle could contract the disease from soil or vegetation contaminated with bison fetal fluids even only weeks after giving birth.

Response: It is true that separation of cattle and bison would virtually eliminate the risk of transmission of brucellosis. Separation removes all risk from direct contact between infected bis on and susceptible cattle (e.g., the 30%–35% of cows where vaccination has not been effective). While environmental contamination in the form of aborted fetuses, placentas, or fluids from birthing, and even contaminated urine, feces, or fluids from draining abscesses, could occur (see "Bison: Definition of Low Risk" in this volume for more information), the commenters are correct in noting that the *Brucella* organisms may not remain viable for more than a few days if conditions are similar to those in a recent study in Wyoming (Cook 1999) (see "Bison: Risk Management" in this volume for more information). Although cattle are naturally curious, and could lick or smell a birthing site, any residual bacteria may be killed in a matter of days during May or June if the conditions are similar to those in the Wyoming study (Cook 1999). (It should be noted that while the Wyoming study provided extremely valuable information, the study's climate, weather, ground cover, and other factors differ from the area addressed by this environmental impact statement, especially in the west boundary area. Therefore, using the findings of the Wyoming study to draw conclusions about *B. abortus* persistence in the Montana environment, especially on the west side, must be done with great care.) None of the alternatives anticipates allowing susceptible cattle

on land that had been occupied by bison before May 15, at least 30 days from the time all bison have been hazed back into Yellowstone National Park (in alternative 2, no susceptible cattle occupy the impact area at any time of the year). This time delay is intended to ensure that all bacteria have been destroyed (Kurz 1999a) and eliminate the risk of bison-to-cattle transmission through environmental contamination. Through the use of spatial separation, and a waiting period in the spring long enough to kill bacteria, the risk of transmission to cattle both directly through contact with infected bison, or indirectly from environmental contamination, can be eliminated.

Where bison occupy lands that will be grazed by cattle in the late spring and summer, scavengers may provide additional assurance that the site is free from environmental contamination by consuming part or most of any aborted fetuses or afterbirth. Although there is some possibility that predators and scavengers could increase the spread of brucellosis by dragging infected material over a long distance (as to a den) or passing the bacteria in its feces, the National Research Council/National Academy of Sciences scientists concluded that "the chance of transfer seems extremely small under most conditions." It is more likely that the presence of these carnivores in the ecosystem reduces the frequency of the bacteria moving between bison, elk, and cattle (NAS 1998; see "Wildlife: Brucellosis in Other Wild Ungulates — Issue 5 [Transmission of Brucellosis by Other Wildlife]" in this volume for more information).

Representative Comment: 131G, 445A, 10457C, 194A, 131G, 1557a, 1961A, 4001E, 15187B, 4001E, 11124E, 5917D

C Comment: Haven't bison in the Yellowstone National Park herd built up their immunity to brucellosis? Many are naturally resistant as indicated by few abortions and few with signs of any pathology. Only four abortions have been documented in the Greater Yellowstone Area in the last 75 years.

Response: Physical symptoms of brucellosis can be common in some bison herds, especially those recently exposed to the disease. However, in the park population, examinations of carcasses or field observations have revealed few individuals with any apparent pathology (APHIS, Yellowstone National Park, unpubl. data). Bison abortions in the park herd also appear to be rare. As noted by the commenter, in the last 75 years only four cases of bison abortion in the park have been recorded. Since regular surveillance has not been done, the actual number of abortions is higher. However, experts have noted that, if abortions were common, many more reported cases would have been expected (NAS 1998; see "Bison: Brucellosis Risk Management — Issue 9," in this volume for more information on abortions and "Bison: Brucellosis in the Yellowstone Bison Herd" for information on pathology in the Yellowstone bison herd). For these reasons, the Yellowstone National Park is considered to be chronically infected, that is to have built up some immune response from natural infection that might induce some degree of protection against *B. abortus* (Olsen et al. 1998; NAS 1998). This phenomenon has also been observed in chronically affected cattle herds, and is probably a result of the animals building some immunity due to chronic exposure to a sub-infectious dose of bacteria. Researchers have identified a gene in bison (and cattle) that does confer natural resistance to brucellosis and have tentative approval to determine the frequency of this gene in the Yellowstone National Park population (see "Bison: Brucellosis Risk Management — Issue 7" in this volume for additional information).

Representative Comment: 1557AC

D Comment: Although the agencies kill seropositive bison, less than half these bison are actually infectious. Almost none killed in the winter of 1996–97 were infected with the bacteria. Researchers are only able to find the actual bacteria in tissues through culturing in about 10%–15% of the bison sampled. Doesn't this mean the risk is substantially less than the agencies have assumed?

Response: There are no methods by which to accurately predict the percentage of seropositive bison that are actually infectious. Infectiousness depends on shedding (bacteria numbers, timing, method, and frequency of shedding), susceptibility of other animals, nature of the contact between a susceptible host and shed bacteria, time and weather conditions between shedding and contact by a susceptible animal,

bacterial dose received by a susceptible host, and many, many other factors. The simple presence of *B. abortus* in a bison is not sufficient to determine whether that bison is infectious.

It is true that the number of bison testing positive for the bacteria in tissues is consistently lower than that in serum. This is true for cattle as well, and is largely a feature of difficulties with culturing bacteria from a chronically infected population. Since it is certain that bison from whom bacteria can be cultured are infected, culturing of bison tissues for *B. abortus* provides a MINIMUM estimate of the percentage of bison that are infected. For additional discussion on the serology and culture relationship, see volume 1, "Affected Environment: *Brucella Abortus* in Yellowstone Bison." Currently, available techniques do not permit determination of the true percentage. It may be close to the minimum estimate, far above, or anywhere in between (see "Bison: Brucellosis Testing" in this volume for more information).

The agencies have not assumed a particular level of risk, because the risk of transmission is too small to measure accurately (NAS 1998; also see "Bison: Brucellosis Risk Management — Issue 1A" in this volume), and many of the features affecting risk are unknowns. Therefore, any assumptions about the percentage of seropositive bison that are truly infected have no bearing on management strategies at this time.

Representative Comment: 194A, 5635D, 9704B

E Comment: Some types of bison pose little or no risk of transmission to cattle, since the primary route of environmental contamination is from abortions or births. These include bulls, immature bison, or nonpregnant female bison.

Response: Some bison — bulls, yearlings, calves, and female bison that have live calves and have totally passed all birth membranes — are defined as "low risk" by APHIS (see DEIS, pp. 369–370). This is because the risk of environmental contamination comes primarily from birth membranes and associated fluids. "Low-risk" bison are not capable of contaminating the environment with these birth products. Any risk they do pose (see "Bison: Definition of Low Risk — Issue 3 [Transmission by Certain Age/Sex Classes of Bison] in this volume) is considered "de minimus" by APHIS, compared to that posed by abortions or live births. As noted in response to issue 1B above, by maintaining spatial and temporal separation between potentially infectious bison (those posing a higher risk of transmission) or their birth products and susceptible cattle, risk can be virtually eliminated. This naturally applies to nonreproductive fluids or feces as well (see "Bison: Risk Management — Issue 9" in this volume and Kurz 1999a for more information). In other words, even the "de minimus" risk they pose would be virtually eliminated through spatial and temporal separation.

Representative Comment: 194A

F Comment: The disease is sexually transmitted. Because bison and cattle can breed, brucellosis can be transmitted to cattle via this route.

Response: Brucellosis is considered a reproductive disease because it is spread at calving or abortion, but it is generally not considered a sexually transmitted disease of bison or cattle. Bison bulls do develop orchitis (inflammation of the testicles), epididymitis, and seminal vesiculitis when infected with *B. abortus* bacteria. This suggests that excretion of bacteria into the semen and urine could pose a risk of venereal transmission. However, the shedding of the bacteria in semen in bison is reportedly rare, and documentation of sexual transmission in bison, or between bison and cattle, does not exist (NAS 1998, pp. 25–26). Experiments with cattle have shown that transmission through copulation, even between male and female cattle under confined conditions, rarely, if ever, occurs (NAS 1998). In one study, the *B. abortus* organism was never transmitted to cows serviced by an infected bull over a three-year period, despite its presence in semen. Although this means the risk posed by bull cattle to female cattle is very small, the risk of transmission by bison bulls to female cattle is even smaller, since cross breeding is unlikely to happen on the open range (NAS 1998). The risk of transmission from bulls to female cattle appears to be "vanishingly small" according to the NAS report and other sources (Greater Yellowstone

Interagency Brucellosis Committee 1995). Spatial and temporal separation would reduce the risk virtually to zero.

Representative Comment: 9207B, 5346C

G Comment: There are differences between cattle and bison that affect risk. For instance, transmission among cattle differs from transmission among bison. Also, the organism is adapted to cattle and cannot live in bison; it is caused by different pathovars in bison and cattle. Bison are a stronger, heartier breed than cattle and are resistant to brucellosis.

Response: It is the same species of *Brucella* bacteria that infects both cattle and bison, as well as elk and other ungulates (see DEIS, p. 18) and it is the same biovar (strain) detected in cattle and bison in the U.S. It is true that differences between cattle and bison exist, e.g., biological differences in antibody production and other immunological factors, as well as the susceptibility of bison to infection. However, according to the National Academy of Sciences, the differences "have not been shown unequivocally to underlie a major difference in pathogenesis that should shift our view of the pathobiology of brucellosis in this species." (NAS 1998, p. 18). There are fundamental differences between how cattle are managed and the natural behavior of free-ranging bison in the Greater Yellowstone Area (NAS 1998, p. 45). These differences may result in some differences in the nature of transmission among bison compared to among cattle. Some researchers question how a near 50% seroprevalence level can be maintained without regular observations of abortions in the bison herd. There is evidence that bison that are not part of a chronically affected herd (e.g., not exposed for a long period of time) are more susceptible than cattle to abortion when challenged with the bacteria. However, most scientists continue to believe the two most probable source of *B. abortus* transmission in both cattle and bison are abortion and birth (NAS 1998, p. 46). Because of the long exposure of the Yellowstone National Park bison herd to the bacteria, it responds more like chronically infected cattle herds, which have developed an immune response that confers some degree of protection against *B. abortus* (NAS 1998, p. 37). About 10% of bison in one study (not Yellowstone National Park bison) were found to have natural resistance associated with the bison homolog of the cattle NRAMP1 gene. The frequency of natural resistance associated with NRAMP1 in a cross section of cattle in a separate study was about 20% (Joe Templeton, Texas A&M Univ., pers. comm.; see "Bison: Brucellosis Risk Management" for more information; also see previous response to comment, "Brucellosis — Transmission and Public Perception," issue 1D.)

Representative Comment: 10567H, 10567H, 16698B, 15369C, 15078B

H Comment: The NAS report states that the most workable method of reducing the risk of transmission of brucellosis from bison and elk to cattle in the Greater Yellowstone Area is vaccination of cattle. Shouldn't cattle, rather than bison, be vaccinated? If cattle are vaccinated, wouldn't this keep bison from being slaughtered? Isn't vaccination about 70% effective?

Response: Yes, cattle research has found vaccination 65%–70% effective against artificial challenge. Vaccination of cattle reduces the number of susceptible cattle in the impact area, and ranchers in the Greater Yellowstone Area do currently vaccinate their cattle. Vaccination of bison is expected to reduce the disease prevalence in the herd and therefore the number of bison capable of transmitting the disease. These vaccination practices would substantially reduce — but not eliminate — the chance of transmission if bison and cattle were in contact, or if sources of environmental contamination were to remain viable as late as the "cattle on" date in the late spring. However, it is the intent of temporal and spatial separation of bison and cattle, a part of all alternatives where bison winter outside Yellowstone National Park, to entirely prevent contact or contamination. Removal of bison to quarantine or slaughter is one of the methods of achieving temporal and spatial separation, and this is proposed in most alternatives. However, vaccination of bison and cattle would be prudent to include as management tools, should bison not be amenable to hazing back into the park, or separation would not be 100% successful. It is also an important tool to begin moving toward the eventual elimination of brucellosis in bison. Although eradication is not an objective of the plan, reducing seroprevalence as a commitment toward the eventual elimination of the disease in bison is an objective.

Representative Comment: 15361C, 7831A, 194A

I Comment: Bison on private land can be removed if the landowner wishes. The chance of bison aborting on such private land and transmitting the disease to cattle seems remote.

Response: Although this may be true, the risk of abortion and subsequent transmission increases when brucellosis-affected bison and susceptible cattle intermingle. At the time the *Draft Environmental Impact Statement* was written, some cattle were ranched adjacent to the northern boundary of Yellowstone National Park. Because of the risk of transmission through direct contact, or contact with aborted fetuses or birth fluids or tissues, bison were kept from this land through the use of hazing or lethal controls. However, in 1999 the U.S. Forest Service, working in partnership with the Rocky Mountain Elk Foundation and the Department of the Interior, acquired conservation easements and fee title to some of this land. An existing cattle lease on the land will expire in 2002. It is expected that the risk of transmission from bison to cattle on these lands will then be virtually eliminated, as temporal and spatial separation will be maintained.

Representative Comment: 165D

J Comment: There is too much management for such a low risk of transmission. There is too much time and money wasted on preventing transmission. Scientific evidence suggests the risk is so remote that slaughter or limiting bison habitat is not justified.

Response: As noted above, the risk of transmission between bison and cattle is low but not zero. Spatial separation to prevent direct contact between the species, and temporal separation to prevent transmission through environmental contamination, would virtually eliminate even this low risk. Spatial and temporal separation may be achieved when bison either return on their own or are hazed into Yellowstone National Park in the spring under most alternatives. If spatial and temporal separation was not achieved through bison returning or being hazed, then capture, test, and removal either to slaughter or quarantine would be implemented to ensure separation under some alternatives, including the modified preferred alternative. Although each alternative would require the expenditure of federal and state money to prevent brucellosis transmission to Montana cattle, the significant effects of such transmission are considered worth the cost of prevention. As noted above (see response to issue 1A), if transmission to a bovine cow occurs, she may test negative and be transported out of the state or to another location in the state while incubating the disease. The nature of brucellosis (i.e., epidemiology, transmission, course of the disease in individual animals) is such that the disease could spread before it is detected, causing large-scale economic impacts to monitor and control the outbreak, as well as to regain class free status if it is revoked (see "Socioeconomics: Cost to Livestock Operators" in this volume for more information). This is why prevention, rather than control of an outbreak, is the focus of the plan.

Representative Comment: 15420A, 174F, 14874C, 385B, 85B

K Comment: The risk is so low that Jackson, Wyoming, ranchers allow their cattle to intermingle with bison and elk. Doesn't the NAS report say cases of transmission attributed to wildlife in this area cannot be verified?

Response: The commenter correctly notes that cattle graze on ranches in the Jackson Hole region in the vicinity of the elk feeding grounds, where large numbers of elk and smaller numbers of bison freely roam. Between 1961 and 1989, cattle on six ranches in this vicinity became seropositive. One of these outbreaks in 1988, and another in early 1989, led to a court case where the plaintiffs alleged the U.S. government had failed to control wildlife movements from the National Elk Refuge, Grand Teton National Park, and/or Yellowstone National Park onto private land, thereby leading to transmission of brucellosis from elk or bison to cattle. An epidemiological study of the outbreak concluded that elk or bison were a potential source for brucellosis in the cattle. Although the court noted that the brucellosis outbreak most likely was caused by contact with infected elk or bison because they were the only known sources of brucellosis in the state, it also concluded that the plaintiffs failed to prove wildlife came from these federal

properties. According to the NAS report, the "evidence" of transmission from elk or bison to cattle was circumstantial and not able to meet the standard of scientific research. Most of the cases were summarized after the fact, some without supporting documents that had been discarded. According to the NAS report, the ambiguity of the epidemiological evidence collected in each of these six cases means "wildlife cannot be determined to be the source of brucellosis infection" (NAS, p. 45). Some researchers note that occasional outbreaks in cattle are typical for some time after a state has been declared class-free by APHIS. No cases of seropositive cattle in this same region have been reported since 1989; this may support the "occasional outbreak" theory. However, a documented case of fistulous withers (a clinical sign of brucellosis) and positive brucellosis blood test in a horse that had been in proximity to elk in Wyoming is evidence for transmission from wildlife to domestic animals in the Greater Yellowstone Area. Furthermore, since transmission between both bison and cattle and elk and cattle has occurred under experimental conditions, the risk cannot be assumed to be zero when the species intermingle (NAS 1998, p. 43).

Representative Comment: 15142AE, 2901B

L Comment: The risk is impossible to quantify.

Response: According to the NAS (1998), the risk of transmission cannot be quantified because it is too low to measure accurately. Also, most of the variables that define risk, such as the frequency of abortions, the number of infectious females occupying land outside Yellowstone National Park where cattle may later graze, the probability of exposure of a susceptible host, etc., are unknown (see DEIS, p. 19). Management actions in the environmental impact statement are, therefore, based on the presumption of risk, and specifically on three assumptions: (1) that the presence of antibodies detected by blood tests indicates the presence of the bacteria; (2) that the presence of antibodies indicates the bacteria are transmitted among bison in the herd; and (3) that, therefore, there is a potential for transmission from bison to cattle (see DEIS, p. 18).

Representative Comment: 2B

M Comment: A reasonable livestock surveillance program would ensure that, in the unlikely event of transmission from bison, the infection would be easily contained.

Response: Even with a reasonable surveillance program, there is a risk that the disease could travel and spread before being detected. Due to the normal marketing patterns in the cattle industry, surveillance would have to be maintained nationwide. However, *B. abortus* can have a prolonged incubation period, and an animal exposed in the Greater Yellowstone Area could transmit the disease to many animals nationwide before being detected by the surveillance systems. Therefore, it is critically important to prevent transmission, rather than just depending on finding the disease in cattle at some later date.

Representative Comment: 10575F

N Comment: The need for spatial and temporal separation was questioned by some commenters. Others argued that separation was questioned such as by modifying grazing allotments to prevent overlap, could drastically reduce the risk of transmission.

Response: Although experience to date from intermingling wild and free-ranging bison and cattle suggests that the transmission risk is low (see issue 1K above), the agencies cannot assume it is zero, since transmission between the species has taken place under confined, experimental conditions. The agencies believe the most effective way to eliminate even this low risk is through the use of spatial and temporal separation. All alternatives except alternatives 2 (which would not allow any susceptible cattle in the impact area) and 5 (which would not allow any bison outside Yellowstone National Park) include the provision for both spatial and temporal separation. If cattle and bison do not intermingle, no transmission from direct contact can occur. If cattle are not returned to lands where bison have wintered until

environmental conditions are sure to have killed all *B. abortus* in the environment, no contamination from fluids or tissues from aborted fetuses, live births, feces, urine, or draining abscesses could occur.

Representative Comment: 15526B, 14819EE

O Comment: Evidence exists for transmission of the bacteria from bison or elk to cattle, and specifically identified several experimental cases (Sybille Wildlife Research Center, Texas A&M University), as well as evidence of infections in the field, including the Jackson Hole cases above (1K), an infected horse kept on the Wyoming elk feedground, and two cases of infected elk hunters.

Response: Please note that the response to issue 1K above, and many of the other responses, verify the agencies' recognition of experimental transmission of brucellosis from bison to cattle. The case of the horse, as identified by the commenter, was that of a nine-year-old pregnant mare that had contact with elk in the winter feeding ground. The mare developed "fistulous withers," the sign of infection by *B. abortus*, but did not abort the foal. Neither the placenta nor the foal had evidence of the bacteria. A second horse used to pack out hunted elk in the Greater Yellowstone Area also developed fistulous withers and positive blood tests. It was treated with tetracycline before microbiological culture was attempted, but the culture did not grow *B. abortus*. It is not surprising that hunters may contract the disease if they do not follow precautions when dealing with elk, particularly pregnant elk. The *Draft Environmental Impact Statement* has a list of precautions and risks to bison hunters in "Environmental Consequences: Impacts on Human Health," alternatives 3, 4, and 7. It should also be noted that no evidence exists of infection in Native Americans who have helped agencies to field dress bison carcasses shot as a result of the *Interim Bison Management Plan,* despite their "mucking through the guts" of hundreds of Yellowstone bison (NAS 1998, p. 86).

Representative Comment: 10638H

P Comment: If brucellosis is such a concern, why are gut piles left at Horse Butte?

Response: Winter conditions on Horse Butte make removing the gut piles extremely difficult logistically. Risk of brucellosis transmission to livestock, wildlife, and humans is mitigated by removing mammary glands and pregnant uteri, the organs most likely to contain large numbers of the bacteria.

Representative Comment: 671AA

Q Comment: Brucellosis is not spread by casual contact between animals.

Response: This is true. Bison with nonreproductive tract infections do not generally pose a risk of transmission (NAS 1998, p. 19). It is only through the licking or sniffing of aborted fetuses or fluids and exudates associated with birth that adult cattle, and presumably bison, contract the disease. Bison and cattle calves may experience "vertical transmission," that is, transmission across generations through drinking the milk of an infected dam (NAS 1998, p. 23) or becoming infected during or before birth.

Representative Comment: 8261B

Issue 2: ***Brucellosis Transmission from Bison to Cattle in the Wild***

A Comment: Evidence of transmission from bison to cattle in the wild does not exist, and therefore management to combat "a virtually nonexistent" threat should not be undertaken. Others maintain that, because transmission under other conditions has been shown to occur, steps need to be taken to prevent transmission.

Response: The implication of this statement is that such transmission in fact has never occurred and will never occur even if measures to prevent commingling of bison and cattle are removed. While the statement as written is technically true, it is incomplete and misleading because it is also true that there are

no data or scientific documentation that brucellosis transmission has never occurred or can never occur from free-ranging bison to cattle. It has been suggested that cattle transmitted brucellosis to bison in the Yellowstone National Park area around the turn of the century. Under the commingling conditions that existed at that time and after, it is not unreasonable to ask whether brucellosis might have been transmitted in both directions — bison to cattle and cattle to bison. The statement also ignores additional factual information: (1) Controlled experimental studies have proven that *B. abortus* is capable of being transmitted from infected bison and elk to uninfected cattle. (2) Transmission of brucellosis from ranched bison to ranched cattle has been documented. (3) A horse in Wyoming was diagnosed with brucellosis after a history of being on a feedground with elk. (4) Particularly since the mid-1980s, the state of Montana has taken measures to prevent commingling of cattle with Yellowstone bison. The lack of documented transmission from Greater Yellowstone Area bison to Greater Yellowstone Area cattle is a tribute to the disease-control efforts of the agencies. There is clearly disagreement as to the magnitude of the risk of bison-to-cattle transmission. However, the NAS report (1998) states that, "The risk of bison transmitting brucellosis to cattle is small, but it is not zero."

Representative Comment: 4981A, 429B, 4873A, 5394A, 9157D, 1063B, 191B, 4136D

B Comment: How can some people note brucellosis has never been transmitted from wild, free-ranging bison to cattle, but also say reinfection from elk will prevent the eradication of the disease in bison?

Response: The agencies are unable to defend or respond on behalf of comments from another organization. However, as noted above, the agencies have assumed that, since transmission can occur in confined, experimental conditions, it could also occur in the wild. Therefore, the separation of bison and susceptible cattle, and/or a waiting period to permit natural destruction of *B. abortus* in the environment are part of all alternatives. This spatial and temporal separation of bison and cattle would not prevent the reinfection of bison from elk, however, as no means to maintain the separation of infected elk and bison are proposed or anticipated. In some alternatives (such as 5 and 6) where intensive capture, test, and slaughter programs would reduce seroprevalence to near zero, reinfection by elk is a noticeable and potentially important impact (see "Bison: Brucellosis in Yellowstone Bison Herd," and "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information on the potential of elk to reinfect bison.)

Representative Comment: 15316BB

C Comment: Commingling in the Jackson Hole area for the last 50 years, and in 1988–89 in Paradise Valley when bison "escaped" has not resulted in transmission. It is reasonable for Montana to expect the same.

Response: Please note responses to 1K and 2A above for more detail. Experimental evidence shows that such transmission is biologically possible. If brucellosis was transmitted to Montana cattle, severe economic consequences could occur to the state's livestock industry associated with the revoking of its class free status with APHIS (see "Socioeconomics: Costs to Livestock Operators" in this volume or "Environmental Consequences: Impacts on Socioeconomics" in volume 1 for more information). Therefore, the agencies have agreed to address the risk of brucellosis transmission from Yellowstone bison to protect the economic interest and viability of the livestock industry while at the same time maintaining a wild and free-ranging population of bison. This can be accomplished by keeping potentially infectious bison or their birth products and susceptible cattle separate.

Representative Comment: 15420FB

D Comment: During the 40 years that bison and cattle grazed side by side in Glacier National Park, there has been no case of brucellosis transmission. There has never been a case of brucellosis transmission from bison to cattle in the 80 years that bison have been in Yellowstone National Park.

Response: We are assuming the commenter is referring to Grand Teton National Park, where it is true that bison and cattle may intermingle. Please see response to comment 1K above. As to the second part of the

comment, bison from Yellowstone National Park were kept at artificially low numbers from the 1930s through 1968 by removals from inside the park. From 1968 to the present, bison have been removed when they leave the park, or have been hazed back into the park before cattle graze in the summer. Although it is possible that brucellosis transmission from wild and free-ranging. Yellowstone bison to cattle would not occur if they commingle, the agencies are aware that transmission in experimental conditions has occurred and is therefore a possibility. They therefore view the enforced separation between Yellowstone bison and cattle described above (and on pp. 145–47 of the DEIS) as at least a possible reason no brucellosis transmission has occurred, and include it in all alternatives in the environmental impact statement.

Representative Comment: 4490E

E Comment: Transmission from bison to cattle has been demonstrated only in a laboratory environment. It did not mimic field conditions. It appears that the *Draft Environmental Impact Statement* is justifying its entire action based on this one study. Moreover, the study was conducted at an agricultural university facility with decided biases towards the livestock industry.

Response: Besides the university study, there are well-documented cases of transmission from domestic (captive) bison to cattle. The results of the university study have been extensively peer reviewed by animal health specialists and rigorously peer reviewed prior to publication in a refereed scientific journal. Therefore, there is no question of the validity of the data. However, it is true that behavioral and habitat differences may prevent overlap of bison and cattle (and therefore transmission of the disease) in a large open space such as the Greater Yellowstone Area. As noted above, because the economic consequences of transmission to Montana cattle could be serious, the agencies have assumed the risk is low but not zero. They have, as the commenter notes, based this assumption on the results of experimental data.

Representative Comment: 14609G

F Comment: Although transmission has not been documented, the concern of the ranchers about brucellosis infection is understandable.

Response: The concerns of ranchers are addressed in detail in the *Draft Environmental Impact Statement*; (see pp. 233–244, pp. 246–265; and pp. 22–26). This volume also contains information on this topic, particularly in "Socioeconomics: Costs to Livestock Operators."

Representative Comment: 63A, 7197B, 197B, 2452D

G Comment: If there were such transmission, Idaho and Wyoming would fear Yellowstone bison. (230B)

Response: Idaho and Wyoming are well aware of the risk and prohibit (Idaho) or limit (Wyoming) Yellowstone bison in their states. They are also vaccinating and testing high-risk cattle herds to ensure that brucellosis has not spread.

Representative Comment: 230B

H Comment: Since transmission has not been documented, statements in the *Draft Environmental Impact Statement* such as risk of disease transmission, threat of brucellosis, or probability of transmitting it to cattle outside the park should be watered down in the final environmental impact statement.

Response: As noted in the *Draft Environmental Impact Statement* (p. 19), there is considerable disagreement regarding the risk of *B. abortus* transmission from bison to livestock. In "Alternative Interpretation of Risk" (DEIS, p. 20), some of these disagreements are explained. However, no conclusions on the degree of risk are included in the *Draft Environmental Impact Statement*. Since the time the draft document was released, a team of scientists contracted by the National Academy of Sciences released a final summary report of available information on brucellosis in bison and the risk of its transmission to cattle (NAS 1998). Many of the unknowns that the *Draft Environmental Impact*

Statement references are also reported in the NAS study. It noted, for instance, that almost no controlled research has been conducted on the mode of transmission or the probability of transmission among free-ranging wildlife and cattle (NAS p. 16). It has also helped to elucidate some aspects of risk. For instance, the report states that only bison with reproductive tract infections present a risk (NAS p. 19), that the presence of the bacteria in bison semen and urine has not been adequately documented (NAS p. 25), and that the risk of transmission by bull bison appears to be "vanishingly small" (NAS p. 27). The NAS report also states that the epidemiological evidence of transmission between wildlife (presumably elk) and cattle in the Jackson Hole area (which some have cited as evidence that transmission in the wild has occurred) was "ambiguous," "circumstantial," and "not intended to meet the rigorous standards imposed by scientific research" (NAS p. 45). The report concludes that the risk of transmission from bison to cattle is very low, but because brucellosis has been transferred from bison to cattle under experimental conditions, the risk is not zero (NAS pp. 43, 80). Also, see the response to 2A above.

Representative Comment: 581E

I Comment: Despite scientific evidence to the contrary, ranchers maintain that bison regularly transmit brucellosis to cattle.

Response: In other areas of the country, transmission of brucellosis from bison to cattle appears to have occurred under range conditions, that is, where both species are allowed to roam over a ranch rather than confined in a pen together. The 1998 NAS report notes that bison-to-cattle transmission under range conditions has been reported in Arkansas (NAS 1998, p. 80). These conditions are different both from the confined experimental ones, and the free-ranging ones for the Yellowstone area herd. As noted above in response to 1K, some believe cattle in the Jackson Hole area may have been infected by free-ranging wildlife (presumably elk), although the data are ambiguous. In the impact area of this project, cattle have not been infected with brucellosis for at least the last 50 years.

Representative Comment: 2573A

J Comment: The only case of bison-to-cattle transmission that one commenter was aware of occurred in Custer State Park, South Dakota. Apparently a bovine cow at the park aborted and tested positive after abortion, but the test was inconclusive because there was no test prior to the abortion.

Response: The current state veterinarian and APHIS area veterinarian in charge in South Dakota have no records or knowledge of such a case. As noted above, this could have occurred since there have been documented cases of privately owned bison transmitting brucellosis to cattle, and bison-to-cattle transmission has been demonstrated under experimental conditions.

Representative Comment: 5384C

K Comment: The myth of brucellosis transmission from wild bison to cattle is a lie concocted by the cattle industry.

Response: Because brucellosis can be transmitted from bison to cattle when the two species are confined together, it is clearly a biological possibility. Although differences in behavior and habitat may normally keep the two species from intermingling in the wild, it takes only one exception to this normal behavior to result in infection of a bovine cow. Transmission in the wild from bison to cattle may or may not have occurred, and it is true that it may or may not occur without management to keep the species separate. However, because the economic impacts of transmission would be significant, the agencies must assume Yellowstone bison are a possible source of brucellosis infection to area cattle, and they must take action to continue to keep them separate.

Representative Comment: 6675B

L Comment: The real goal is to avoid any public perception that brucellosis can be transmitted from free-ranging bison to privately owned cattle.

Response: We disagree. The real goals are stated in the *Draft Environmental Impact Statement* pp. 11, 28–30. All alternatives include a number of measures in different mixes aimed at preventing the transmission of brucellosis from bison to cattle. If the agencies believed brucellosis could not be transmitted from free-ranging bison to privately owned cattle, as the commenter suggests, no management effort would be required. However, education, both of the public and other states importing Montana cattle, on the effectiveness of these management techniques, may be an important part of any plan the agencies implement.

Representative Comment: 7006D

M Comment: If brucellosis cannot be transmitted in the wild, why are 50% of the park bison seropositive, and 25% proven to be active carriers? If brucellosis cannot be transmitted in the wild, then why did 6% of the elk tested at Gardiner two years ago test seropositive? There is an increased risk of transmission of brucellosis from Yellowstone National Park bison to livestock and other wildlife in all alternatives except alternative 5 and alternative 6 with changes.

Response: Clearly, the disease is being transferred among bison and among elk in the Greater Yellowstone Area. Although the primary mechanism of that transfer, i.e., the licking or sniffing of aborted fetuses or birthing materials, is presumed to be the same in the Yellowstone bison as it is in cattle, researchers remain unsure if this is the case. However, as the commenter correctly notes, seroprevalence (indicating the presence of antibodies) remains at about 50%, and some of those animals also test positive for the bacterium itself. Although the study or management of elk is not part of this action, a very small portion (1%–2%) of elk on the northern range do test positive for exposure to *B. abortus.* These elk could be moving from the southern range, which includes the feedgrounds where seroprevalence is much higher, or they could be intermingling with Yellowstone bison. The 1998 NAS report notes that the habitat requirements of elk and bison overlap broadly, a factor that could bring the two species into contact even in the wild. The agencies do not agree that all alternatives except 5 and 6 would increase the risk of transmission from bison to livestock. As noted in the *Draft Environmental Impact Statement*, it takes the commingling of an infected bison and a susceptible bovine cow to transfer the disease directly (see p. 19). In all alternatives, infected bison and susceptible cattle are not allowed to intermingle, so direct contact is not possible. The only other source of transmission from bison would then be environmental contamination, from aborted fetuses, birth materials, urine, feces, draining abscesses, etc. Although the bacteria in these discharges remain viable for longer periods during cold weather than in the direct sunlight, dryness, and other environmental conditions of warm weather, cattle would not return before late spring to lands formerly occupied by bison. As noted in the *Draft Environmental Impact Statement*, no alternative would allow susceptible cattle to return until a minimum of 30 days following bison removal, thus providing time for environmental conditions to destroy live *Brucella* organisms. Therefore, all alternatives "protect livestock from the risk of brucellosis," an objective of taking action (as noted on p. 29 of the DEIS, objective 5).

Representative Comment: 10638L, 101A, 3306B, 14910D

N Comment: The fact that bison-to-cattle transmission in the wild has not been proved is not the point. Instead we should focus on the strict state and federal standards for interstate movement of cattle. These standards are responsible for the public health in this country and the safety of the milk supply.

Response: We agree that proof that transmission can occur under wild and free-ranging conditions where bison and cattle commingle is not needed to assume such transmission might take place. Although the standards that the commenter cites have been effective in nearly eliminating brucellosis from cattle and milk supplies in the U.S., there is some concern that brucellosis transmission, should it occur if bison in the Yellowstone area and cattle were allowed to intermingle, would not be immediately detectable. The disease can have a long incubation period, or lie dormant in an individual until she becomes pregnant.

These cows could test seronegative and be transported legally out of the area under the rules noted in the comment. Therefore, the agencies believe preventing transmission is the key to managing brucellosis in bison. This can be accomplished through temporal and spatial separation, as described in the responses to many of the comments in this section.

Representative Comment: 14884E

O Comment: Some commenters noted that the six cases alleging the transmission of brucellosis from wildlife to cattle in the Jackson Hole area cannot be verified. Others noted that the reason no documented cases of transmission from wildlife exist is of the difficulty controlling all variables in such a study.

Response: Both of these statements have some truth. In epidemiological disease investigations on wild populations it is sometimes impossible to control and/or identify all variables. As a result, many livestock disease investigations conducted by APHIS have been determined by the preponderance of circumstantial evidence, rather than statistically significant results. In the case of the Jackson Hole cattle (see 1K above), elk and cattle had commingled in four of the six cases, and elk, bison, and cattle had had contact in the remaining two. Some speculate that the outbreaks occurred because brucellosis had not been entirely eliminated from the cattle herd (NAS 1998). In this regard, it is noteworthy that no outbreaks in cattle in the Jackson Hole herd have taken place since 1989. However, others believe the preponderance of circumstantial evidence in these cases points to transmission from elk, bison, or both. As noted above, whether transmission in the wild has occurred is almost irrelevant to the bison management planning effort, because it is clear such transmission is a biological possibility.

Representative Comment: 15147AB

P Comment: The organism has been isolated from park bison placentas and transmission has been proved experimentally. All that is needed for the transmission of the disease is exposure, and that exposure can come from an infected calving area.

Response: This is true. Through the use of temporal and spatial separation, both the chance of direct contact with infected individuals and the chance of contact with environmental contaminants, such as infected fetuses or birth fluids, would be virtually eliminated. This is why separation between potentially infectious bison and susceptible cattle is an element of every alternative (see issue 1A and "Bison: Brucellosis Risk Management" for more information).

Representative Comment: 15806B

Q Comment: Brucellosis in bison has not had any health impact on cattle.

Response: When brucellosis is transmitted to "clean" cattle from bison under experimental conditions, health impacts do occur on cattle, including abortion, infertility, swollen joints, and lameness, particularly as a result of acute infection (see volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison" for more information).

Representative Comment: 10280F

R Comment: Interspecies transmission has occurred.

Response: Yes, transmission between bison and cattle has occurred under experimental conditions, as has transmission between elk and cattle. Brucellosis in a horse has been attributed to transmission from wildlife, probably elk.

Representative Comment: 1559A

S Comment: There is recent evidence of brucellosis transmission from wildlife to a horse. Wildlife populations do carry the disease, and livestock do not have the disease unless it is transmitted from infectious wildlife.

Response: We are assuming the commenter is referring to the Greater Yellowstone Area, and the case of the horse the commenter identifies was that of a nine-year-old pregnant mare that had contact with elk in the winter feeding ground (described in response to issue 1O above). This does suggest that horses in direct contact with concentrated populations of infected elk or infected elk carcasses are subject to infection.

Representative Comment: 10616F

T Comment: Why would a healthy bovine cow be nibbling on an aborted bison or elk fetus?

Response: It is normal for animals without prehensile appendages to examine objects by smell and licking with the tongue. By nature, cows are very curious and are very apt to smell and lick anything that attracts their curiosity. As noted in the NAS report (pp. 19–20), particularly two-year-old males and females in bovid nursery herds sniff and lick expelled placenta and its fluids when birth takes place. Once in contact with mucous membranes of the eye, nose, or mouth, bacteria are taken into the body through tonsils, tear ducts, or oral-nasal lymphoid tissues.

Representative Comment: 463B

Issue 3: ***Approach to Brucellosis Management***

A Comment: APHIS could do what the government of Canada has done, namely declare victory over brucellosis in cattle and work to ensure no transmission occurs between wildlife and cattle.

Response: The U.S. is very close to being able to claim just this. Only a few states are not class-free, indicating the absence of brucellosis in cattle and captive bison. In the Yellowstone area the agencies are working to ensure no transmission occurs between bison and cattle — other wildlife are out of the scope of this particular management effort. We believe separation of potentially infectious bison or their birth products and susceptible cattle will continue to prevent the risk of transmission between them. Education of the public and other state animal health agency officials as to the effectiveness of this separation may be an important component of any plan selected.

Representative Comment: 14819GG

B Comment: We should be searching for a cure rather than killing the bison.

Response: The nature of the disease is that the majority of the bacteria locate inside cells, making treatment difficult. Treatment would be extremely stressful for wild bison, impractical, costly, and most likely ineffective. Developing, testing, and obtaining approval for new antibiotics that would be effective against intracellular organisms such as *B. abortus* would be extremely expensive and may be many years away. At this time, there are no assurances when or if such a product will become available.

Representative Comment: 5187B

C Comment: There must be a sound, scientific way to manage the disease.

Response: We believe, given the biological possibility of transmission between potentially infectious bison and susceptible cattle in the impact area, that separation of these two groups of animals in time and space is a sound, scientific way to manage the disease.

Representative Comment: 8828C

D Comment: Ask Ted Turner how he addresses the problem of brucellosis on his ranches in Nebraska, New Mexico, Arizona, and Montana.

Response: Mr. Turner's bison are not known to be affected with brucellosis.

Representative Comment: 1913D

E Comment: Control the cattle, not the bison.

Response: In alternative 2, cattle are controlled to maintain the separation between potentially infectious bison and susceptible cattle. In alternatives 5 and 6 it is primarily the bison population that is controlled. In alternatives 3, 4, 7, and the modified preferred alternative, both cattle and bison are managed to maintain this separation.

Representative Comment: 13268C

F Comment: Since there are naturally resistant bison, a minimal management approach would allow natural events to produce the best stock.

Response: Although it is true that some percentage of the bison herd is likely naturally resistant to brucellosis (see "Bison: Brucellosis Risk of Transmission" in this volume for more information), it is also true that the symptoms in a chronically infected herd like the Yellowstone bison are often not debilitating to the individual or to its offspring. Therefore, the forces of natural selection, which operate on less-fit individuals, do not effectively work to eliminate infected animals. Even those that abort (and therefore lose the opportunity to pass genetic material along in their offspring) generally do so only once, and so would continue to breed and produce viable, and possibly infected, calves in later years.

Representative Comment: 9144B

G Comment: The following recommendation from the NAS study should be incorporated into the environmental impact statement: The U.S. Department of Agriculture and U.S. Department of Interior should develop a plan to maintain a series of Yellowstone National Park perimeter zones with progressively increasing disease surveillance, vigorous monitoring, vaccination, and contact-reporting programs as one nears the park. The boundaries of the zones should be determined jointly by U.S. Department of Agriculture, Department of Interior, and the states surrounding the park. The plan should remain in place until brucellosis is eliminated from the park. It is important that a team of scientists be involved in this program and that results be analyzed and published in a refereed scientific journal.

Response: For all practical purposes, this idea is already used by the agencies now, and is part of most alternatives in the *Draft Environmental Impact Statement*. SMAs are areas outside the park used primarily as winter range by bison, although in alternative 2, bison would remain year-round, and in alternative 5, SMAs would not exist. Risk management measures within these areas can be intermediate between those of the park and agricultural lands which they separate, e.g., hunting in the SMAs and agency shooting on private lands outside them. In addition, all alternatives include increasingly intensive monitoring of the herd as it approaches park and/or SMA boundaries (see DEIS, p. 57). As recommended by the National Academy of Sciences, the boundaries of these zones would be determined jointly by the U.S. Department of Agriculture, the Department of the Interior, and the state of Montana. This kind of management, where bison would be allowed access to winter range to help complete a natural ecosystem for bison, but would be kept separate from susceptible cattle returning in the late spring, is expected to remain in place until research indicates that other actions would be more reasonable. These might include measures to eliminate brucellosis, if the wild and free-ranging nature of the bison herd could be preserved in the process. It is unclear whether results would be published in a refereed journal, although this is not unlikely.

Representative Comment: 14980G

Issue 4: ***Additional Needed Research***

A Comment: Why not use a "sacrificial" cattle herd to test whether Yellowstone bison can transmit the disease in a free-range environment. If cattle contracted brucellosis from bison, the cattle would be destroyed and the owners compensated.

Response: This indeed would be one way to test that hypothesis. However, this type of experiment would jeopardize the brucellosis-free status of the surrounding states and is contrary to biosafety level standards established for research. In addition, even if transmission did not occur, it would still not prove to ranchers or to the state of Montana that transmission is not a possibility. In other words, it is extremely difficult to prove transmission will never occur in the wild, because it is biologically plausible.

Representative Comment: 5133E

B Comment: There needs to be similar research on elk.

Response: Comment noted. To date, more research on elk than bison has occurred, because of the importance of elk to the socioeconomics of the Greater Yellowstone Area as a tourist attraction and game animal (NAS 1998, p. 71). Much of this work as it relates to brucellosis is summarized in the 1998 NAS report.

Representative Comment: 9116D

C Comment: There needs to be more research on brucellosis in bison and how it affects cattle. Such research is needed to better define the problem.

Response: Research has shown that brucellosis in bison has many similarities to the disease in cattle, and the disease in cattle is well documented. Current research on the pathogenesis and epidemiology of brucellosis in Yellowstone bison will provide more information on the disease process in individual bison and how it is transmitted among Yellowstone bison. The results of this and other research (see DEIS, p. 353 for more information) may be used to revise or update the bison management plan.

Representative Comment: 593D

D Comment: There is no indication of any research designed to assess the threat that bison and elk pose to cattle in the Greater Yellowstone ecosystem.

Response: This is not true. Much of the high-priority research noted in appendix D in the *Draft Environmental Impact Statement* is geared to address how brucellosis is transmitted between bison, between elk, and to determine whether these mechanisms of transmission between individuals of the same species also pose a risk to domestic cattle. Studies are also ongoing to determine the epidemiology and pathogenesis of brucellosis in Yellowstone bison, the relationship between serology and culture results, the frequency and timing of abortions, birthing behavior, etc., in bison. All of these factors affect the risk of transmission to cattle if infectious and susceptible cattle are allowed to intermingle.

Representative Comment: 2970A

E Comment: Encourage research on the epidemiology of brucellosis (among cattle, among bison, and between cattle and bison) and the development of immunity in wildlife. We need to know how brucellosis manifests in wild bison and the exact course of the disease in them.

Response: The epidemiology of brucellosis is well understood in cattle. As noted in appendix D of the *Draft Environmental Impact Statement*, more than a dozen high priority and many other, lower-priority studies are currently in progress or proposed to study the epidemiology and pathology of brucellosis in bison. At least one of these studies assesses genetic resistance to *B. abortus* in elk and bison. Ongoing

research, such as that at Texas A&M referenced in "Bison: Brucellosis Risk Management" in this volume, is also geared to address the degree to which the bison population in the Yellowstone area is naturally immune to the disease.

Representative Comment: 10125B, 8351I

F Comment: The most important research would be that which determines whether bison carry brucellosis, and if so, the percentage of brucellosis infection among the herd.

Response: Research to date shows a portion of the bison herd in the Yellowstone area definitely do carry *B. abortus*. However, limitations of current technology preclude the determination of precisely what percentage of the Yellowstone bison herd is carrying the organism. Several different research efforts have addressed or are addressing brucellosis serology and culture results in Yellowstone bison (for example, Roffe et al. 1999). While these studies have reported varying percentages of seropositive bison that were also culture positive, those percentages are likely only minimum estimates of prevalence. The true prevalence of brucellosis infection in the herd may be near these values, much higher, or somewhere in between. Until appropriate technology is available, we will not be able to accurately estimate the prevalence of brucellosis in any animal population. (See "Bison: Brucellosis Testing" in this volume for more information on culturing bacteria.) Given that some percentage of Yellowstone bison clearly do harbor *B. abortus*, separation of bison and cattle in the Yellowstone area is considered prudent.

Representative Comment: 8930B, 10055D, 6474A

G Comment: There needs to be research on all ungulates indigenous to Yellowstone National Park regarding brucellosis incidence, transmission, and distribution of the disease.

Response: This type of research is being done on bison, elk, and moose in the Greater Yellowstone Area.

Representative Comment: 11461C

H Comment: Do not implement any of the alternatives and do not continue the interim plan. Instead, develop a scientific program to determine whether there is really a transmission problem and then compensate ranchers on private land who can document that brucellosis was transmitted from bison to cattle.

Response: Bison-to-cattle transmission has occurred under experimental and ranch conditions. Therefore, the agencies have assumed "there is really a transmission problem." Although transmission is not known to have occurred from Yellowstone area bison to domestic cattle in the impact area at least during the last 50 years, this could be because the species have not been allowed to intermingle. Allowing them to do so would jeopardize Montana's class-free status. Should transmission occur, there could be adverse economic effects on more than just the individual cattle owner whose herd was affected. The loss of this status would have economic effects on cattle herds throughout Montana (see issue 1M above and "Socioeconomics: Cost to Livestock Operators" in this volume for more information).

Representative Comment: 1816B

I Comment: The initial bison management plan should be modified over time based on research results. Such research should address methods and vaccines to eradicate brucellosis from wild ungulates, Yellowstone bison, and the management of bison habitat.

Response: The bison management plan will be modified over time based on research results within the framework of the selected alternative. There is ongoing research on vaccines and on Yellowstone bison ecology, as well as much more on the epidemiology and pathogenesis of brucellosis (see appendix D of the *Draft Environmental Impact Statement*). Research results on vaccine delivery systems, adaptive techniques, and habitat management will also provide valuable data for modifying management over time.

If the differences between what research indicates should be done to manage bison and the selected alternative would be large-scale and would have potential environmental consequences, then changing the plan would require NEPA/MEPA compliance and public input.

Representative Comment: 2323G

J Comment: Research funding and priorities should be determined cooperatively and with the support of the secretaries of agriculture and interior.

Response: This action is already taking place. Both agencies are cooperating to share resources and planning for brucellosis research on wild ungulates.

Representative Comment: 15874AL

K Comment: I am strongly against my government killing the animals for no other reason than bad research methods.

Response: Although not all important research relevant to this issue has been completed, we disagree that bad methods have been used to date. Research has shown that some Yellowstone bison are infected with brucellosis, and that transmission can occur under experimental conditions. Ongoing research is attempting to identify the mechanism of transmission in the wild, birthing behavior of female bison, minimum infectious dose, and more that will help agencies decide whether and to what degree transmission between intermingling populations under free-ranging conditions is possible. These are difficult and time consuming studies, where many variables are not amenable to human control (see response to issue 2O above). Research methods as well as study results are presented publicly at GYIBC and other meetings, and many are submitted as manuscripts to peer-reviewed scientific journals.

Representative Comment: 16418A

L Comment: Have we done enough DNA typing to locate the cell which the bovine brucellosis will infect? If so we could remove (clone) a good cell to replace the bad.

Response: *B. abortus* is capable of infecting many cell types. Injection of a genetically altered cell to protect against infection is beyond current technology, and genetic manipulation of Yellowstone National Park bison would be more obtrusive in a wild population than would any of the proposed alternatives.

Representative Comment: 16391A

Issue 5: *Brucellosis and Greater Yellowstone Area Elk*

A Comment: Elk and bison in the Greater Yellowstone Area are managed differently, yet both carry brucellosis and pose the same risk. Others said that the risk from elk is higher than bison; and still others said that the risk was lower because of differences in calving.

Response: As noted in the *Draft Environmental Impact Statement*, the scope of this particular management effort is limited to bison. However, it is not true that elk are unmanaged in the Greater Yellowstone Area. For instance, elk in the southern Greater Yellowstone Area in Wyoming are fenced out of areas occupied by cattle or hazed away from private cattle operations in some cases (NAS 1998, p. 76). Some are vaccinated on state feedgrounds (NAS p. 92). It is possible that elk do not pose the same risk of transmission to cattle as do bison. It is possible that behaviors displayed by elk, such as moving away from areas used by cattle, hiding to give birth, and the meticulous cleaning of the birth site by the mother to prevent the scent of the newborn calf, significantly reduce the chance that transmission occurs either between elk, or from elk to cattle or bison. Most researchers believe elk herds are not able to sustain high levels of infection because of these behaviors (NAS 1998, p. 47). Only those using the winter feeding grounds near Jackson Hole have a high (3% to 65%, averaging 30%) seropositive rate. Presumably, this is

due to abortions taking place in the vicinity of the feeding grounds. In the area of impact discussed in the environmental impact statement, seroprevalence in elk is much lower, and ranges between 1% and 2% in the northern range, and between 0.3% and 9.5% in the Madison-Firehole herd (Ferrari 1999). Given the birthing behavior described above and this low seroprevalence rate, the risk of transmission from elk to cattle is considered to be smaller than from bison if they commingle and is acceptable to the state of Montana at this time.

Representative Comment: 106B, 10659D, 5671A, 13058A, 16278B, 515B

B Comment: There has never been a documented case of brucellosis transmission from elk to cattle in the wild. Others say elk have transmitted brucellosis to cattle.

Response: Transmission from elk to cattle has occurred under experimental conditions. It may also have occurred in the wild in the Jackson Hole area, although data leading to such a conclusion are ambiguous (see response to issue 1K above). However, the focus of the management plan is bison, and it is unclear how this comment relates to bison management except as described in the response to issue 5A above.

Representative Comment: 195B, 10657A

C Comment: There are many more elk than bison, and elk are more prone to mix with cattle. Isn't the disease risk to cattle therefore higher?

Response: It is true that there are significantly more elk than bison in the Greater Yellowstone Area. This may be cause for concern if agencies begin to manage brucellosis in elk, as the logistics of managing 120,000 elk in the Greater Yellowstone Area are significantly more challenging than the management of the Yellowstone bison herd. If the risk of transmission was based solely on the number of seropositive wildlife in the area, elk on the southern portion of the Greater Yellowstone Area (in Wyoming, where 22 state feedgrounds and the National Elk Refuge have elk feeding operations), where seroprevalence averages about 30% in a herd of 17,000, would pose a much greater possible threat of transmission to cattle. However, as noted in issue 5A above, risk is also related to the probability of either direct contact, or contact with tissues and fluids from abortions or births. When elk give birth in a normal fashion, they hide from the herd and sanitize the site, greatly reducing the risk of transmission from contaminated fluids or tissues. However, hormonal controls that signal normal hiding behavior may be absent when elk abort. Abortions would likely occur during winter, when the feeding grounds are active and elk are concentrated. Other elk apparently have contact with the fetus and birth tissues before these items are consumed by the aborting elk. The chance of a bovine cow encountering an aborting elk is considered low, although fencing, hazing, and vaccinating are all used (see issue 5A above) to reduce this chance further. Elk also may be less prone than bison to mix with cattle and will avoid them if possible (NAS 1998, p. 49).

Representative Comment: 326B, 10659D

D Comment: Elk fetuses should not be left in the gut piles during the winter hunt.

Response: This is true. Sanitary precautions should be taken during handling and disposal.

Representative Comment: 15166B

E Comment: The 1998 NAS report concludes that brucellosis might disappear from the Greater Yellowstone Area if the disease was eliminated from the bison and if the Wyoming elk feedgrounds were closed. While phasing out these feeding grounds might well raise controversy rivaling the bison brucellosis issue, such a phase-out must be considered.

Response: The consensus of experts polled by the National Academy of Sciences in its 1998 report was that *B. abortus* is not self-sustaining in elk herds that are not concentrated on winter feeding grounds (NAS p. 47). This is largely because of the birthing behaviors described in issue 5A above (also, see

volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison"). However, as noted in the environmental impact statement, this management effort is directed at Yellowstone area bison, and managing the risk of transmission from that herd to domestic cattle in the impact area.

Representative Comment: 15543S, 11409aX

F Comment: Evidence from the Wyoming Game and Fish Department suggests that strain 19 is safe for elk on the feedgrounds and is safe for nontarget species. There should be further research to fully determine the safety and efficacy of strain 19 in bison.

Response: Strain 19 is considered a safe and effective vaccine for elk, and more than 35,000 doses of the vaccine have been given to elk on Wyoming Game and Fish Department-managed feed grounds since 1985 (NAS 1998, p. 92). The vaccine is not considered safe for adult bison, and antibodies manufactured in response to injection with strain 19 are indistinguishable from those produced by exposure to *B. abortus*. Therefore, vaccinated bison would test seropositive in card tests and other serological tests currently used in the impact area. RB51 is a similar vaccine, which does not cause a positive serologic response on these tests. Research is currently underway to determine whether it is a safe and effective vaccine for the Yellowstone bison herd (see "Bison: Vaccination" in this volume for more information).

Representative Comment: 15785B

G Comment: The elk migration impact on the attempt to manage the risk of bison-to-cattle brucellosis transmission needs to be evaluated in the environmental impact statement. Differences in difficulty between the capture and testing of bison and the capture and testing of elk for brucellosis will need to be analyzed. What are the recommendations for handling infected elk? How will they be captured and tested?

Response: This environmental impact statement analyzes the impacts of the proposed alternative bison management plans. Only the commenter's first question has bearing on the management of the risk of brucellosis transmission from bison to cattle, as the agencies will not be making any elk management decisions in this process. In alternatives 5 and 6 seroprevalence can drop to near zero in bison through a parkwide capture, test, and slaughter program. Elk traveling from the feeding grounds in Wyoming, where seroprevalence averages 30%, could act as agents of reinfection. See "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information.

Representative Comment: 11409AX

H Comment: The elk population goals (herd size and composition) have not been discussed.

Response: Elk population goals are beyond the scope of this environmental impact statement.

Representative Comment: 11409AX

I Comment: Brucellosis in elk will hinder the effectiveness of any alternative selected. The impact of the disease in the elk population has not been analyzed.

Response: The effect of elk on achieving reductions in seroprevalence by acting as agents of reinfection has been added into the analysis of impacts on the bison population in the final environmental impact statement. (See volume 1, "Environmental Consequences: "Impacts on Bison Population," and the revised "Methodologies of the Stochastic Model" for this information.)

Representative Comment: 11409AX

J Comment: According to the 1998 NAS report, brucellosis in the elk population will prevent the attaining of objective 4 of the *Draft Environmental Impact Statement* (commit to the eventual elimination of brucellosis in bison and other wildlife).

Response: Objective 4 is not the elimination of brucellosis from bison and other wildlife in the Greater Yellowstone Area. The actions of the proposed management plan were never intended to accomplish brucellosis eradication from the Greater Yellowstone Area. Objective 4 refers to a commitment to eliminate brucellosis from Greater Yellowstone Area wildlife, rather than complete eradication. Although the final plan will not eliminate the disease even from bison, all alternatives contain elements that work toward that end. If eradication of brucellosis in Greater Yellowstone Area wildlife became the objective of a future planning process, these elements will have helped facilitate disease eradication in bison. Bison vaccination, which is common to all alternatives, is an example of such an element. As noted above, elk could act as an agent of reinfection for bison should alternative 5 or 6 be adopted.

Representative Comment: 11409AX

K Comment: It has not been shown that bison can or did transmit brucellosis to cattle. However, it has been shown that most other free-ranging ungulates, including elk, in the Yellowstone area and elsewhere carry the disease.

Response: Both bison and elk have transmitted the bacteria to cattle under experimental conditions. It is unknown whether bison have ever transmitted it to cattle under free-ranging conditions; elk have been implicated in outbreaks near feeding grounds in Wyoming, but the evidence collected is termed "ambiguous" by the 1998 NAS report. The response to issue 1K above has more information on these outbreaks. While it is true that some ungulates in the Greater Yellowstone Area test positive for having been exposed to the disease, it is not true that most free-ranging ungulates show such evidence, or that ungulates outside the Greater Yellowstone Area show this same exposure or carry the disease. Both bison and some elk in the Greater Yellowstone Area have seroprevalence rates higher than 25%. Elk in the northern range adjacent to Montana have lower seroprevalence levels, in the 1%–2% range for the most part. It is possible that some moose in the Greater Yellowstone Area may be seropositive, although all tested in the Greater Yellowstone Area and in Montana have been seronegative. Researchers have speculated that perhaps all infected moose die, leaving no seropositive moose to test (NAS 1998). Mule deer and pronghorn inside the Greater Yellowstone Area have also tested seronegative and are not considered major hosts for the disease.

Representative Comment: 10811B

Issue 6*: Original Source of Brucellosis*

A Comment: Cattle were the original source of the disease. Bison did not have it before cattle brought it from Europe. In Yellowstone, bison got it from cows' milk used to wean them or from direct contact. Therefore ranchers seem to be the cause of their own problem and not accepting responsibility. Others claimed that the notion of bison contracting brucellosis from cattle was "skew and innuendo" of facts.

Response: All evidence points to *B. abortus* being introduced to the U.S. through the importing of European cattle, from which it was subsequently transmitted to bison (NAS 1998; Whittlesey 1995). It is also believed that the weaning of young bison on bovine cows' milk may have inadvertently transmitted the disease to Yellowstone area bison (see DEIS, p. 15). This original transmission took place when little was known about the disease and decades ago when present-day ranchers were not ranching; it is inappropriate and unreasonable to consider them responsible. Nonetheless, livestock operators in and near the impact area do take some responsibility for preventing transmission of brucellosis by bison through vaccination of their cattle herds.

Representative Comment: 14819YY, 42B, 177B, 350A, 15122F

Issue 7: *Brucellosis in Cattle*

A Comment: Is brucellosis harmful to bovine fetuses, pregnant cows, or generally to beef herds? Some believe the livestock industry grossly exaggerates the consequences of brucellosis in cattle.

Response: Brucellosis in cattle can have serious pathological effects. It can cause abortions or produce weak and sickly calves. The disease does not usually kill an adult. The environmental impact statement lists many of the pathological and economic effects of brucellosis in cattle (see DEIS, p. 16 and pp. 22-26). An economic study in the early 1980s estimated the resulting loss in production in affected herds to be close to $50 per animal in the herd. In addition, the *Draft Environmental Impact Statement* (pp. 22–26) describes in great detail what the loss of class-free status might mean to the Montana's livestock-based economy. Additional information on this topic is available in this volume under "Socioeconomics: Impacts on Livestock Operators."

Representative Comment: 92A, 10006H, 13290D, 15095D, 10753C, 1920A

B Comment: Is there a process by which private herds can obtain brucellosis-free certification?

Response: Yes, annual testing of cattle breeding herds has been used to certify herds as brucellosis free for years. To qualify, a herd must periodically test negative for brucellosis as specified in 9 CFR 78. This status is valid for 12 months unless evidence of brucellosis is disclosed in the herd.

Representative Comment: 17724F

C Comment: There is concern that brucellosis-infected cattle could be imported into states that border Montana.

Response: We are assuming the comment refers to cattle to which brucellosis might be transmitted by Yellowstone area bison. The *Draft Environmental Impact Statement* contains an extensive discussion of this concern from the perspective of Montana, the exporting state(see pp. 22–26, for more information). Adjacent states may require testing of cattle pastured in the impact area; for example, those cattle summering in West Yellowstone and wintering in Idaho are tested when entering and leaving Montana (see DEIS, p. 157, for more information). However, to date no outbreaks of brucellosis in Montana cattle in the impact area (or elsewhere in Montana) have occurred. This speaks either to the success of interim management of the bison herd by the agencies, to an extremely low chance of transmission in the wild between bison and cattle, or to a combination of these two factors.

Representative Comment: 8440A

Issue 8: *Brucellosis in Bison*

A Comment: Brucellosis is not common in bison.

Response: It is true that brucellosis is not common in captive bison in the United States. This is largely due to eradication programs in captive herds. However, seroprevalence, which tests for the presence of antibodies and therefore exposure to brucellosis, averages about 35%–50% in the Yellowstone area bison herd. Not all seropositive bison have yielded positive bacterial cultures, which show the definitive presence of the bacteria itself. However, it would be inaccurate to say brucellosis is not common (please see issue 1D above or issue 8B below for more information on culture vs. blood testing).

Representative Comment: 3839E

B Comment: Environmental and animal advocacy groups state that no bison has been found to harbor the *B. abortus* bacteria. There is a video that shows a slaughterhouse operator saying that of over 200 bison sent to them for slaughter by the Montana Department of Livestock, not one of the bison had brucellosis. Bison were tested by veterinarians at slaughter and only 1% of those bison had the *Brucella* organism.

Response: In a recent (1995–98) study using extensive tissue sampling of individual Yellowstone bison, 12 (46%) of 26 female bison that tested seropositive also had positive cultures from one or more tissues. In an ongoing surveillance study, selected tissues from approximately 28% of seropositive bison (both

sexes) yielded *B. abortus* from one or more tissues. Some culture-negative bison could still have been carrying the bacteria but were not identified as such because of limitations in sampling and culture. (See issue 1D and issue 4F for more information; also see "Bison: Brucellosis Testing.") Testing for the presence of the organism (i.e., bacteriological culture of tissues) is not conducted at slaughter. It is also possible that the 200 bison sent to slaughter also included a large number of seronegative bison. These bison would be expected to harbor the bacteria, but in the winter of 1996–97, for example, when large numbers of bison attempted to exit the park at the Reese Creek boundary, no quarantine or other placement options were available, and many were sent to slaughter.

Representative Comment: 886B

C Comment: Roffe et al. (1999) provided evidence that although brucellosis may be endemic to Yellowstone bison, few animals may actually be capable of transmitting the disease. These authors note the discrepancy between the number of bison that test seropositive for brucellosis but culture tissue negative, suggesting that bison transmit the disease only through infected milk and are therefore no threat to other species, including cattle.

Response: Preliminary results by Roffe et al. (1999) indicate that 46% of the seropositive bison samples in a study of pregnant female bison were also culture positive. This study is considered the "gold standard," that is, many types of tissues were cultured, and the group most likely to have high numbers of bacteria (and therefore offer the greatest chance of finding and culturing them) was used for study. In contrast, examination of 17 bulls testing seropositive revealed only two culture-positive animals (Yellowstone National Park, unpublished). The *Draft Environmental Impact Statement* (p. 20) notes that some researchers believe the primary route of transmitting antibodies and/or bacteria in the Yellowstone bison herd may be through mother's milk. However, Roffe et al. (1999) found bison mammary glands less likely to be culture positive than cattle mammary glands. There was only one positive culture from milk of Yellowstone and none from mammary glands, suggesting this is not an important route of transmission.

Representative Comment: 2669B, 4558A

D Comment: If brucellosis causes abortion in bison, is it not a form of population control?

Response: It appears that the presence of the bacteria has not prevented growth of the Yellowstone bison herd. The population has been growing at a relatively high rate since release from artificial control in 1968. Recent research on female bison in the park has documented four reproductive failures in which *B. abortus* was cultured from fetal remains, other remains, and/or the environment at the site. No other documentation exists regarding the frequency of brucellosis-related abortions in this bison population. The NAS report notes that the herd may have some degree of protection against the effects of the bacteria (e.g., abortion) through immune responses from natural infection. It is unlikely, given the observations of a high rate of population growth and limited evidence of abortion, that brucellosis is having any noticeable population control effects. (See "Bison: Brucellosis in the Yellowstone Bison Herd" in this volume for more information.)

Representative Comment: 7680C

E Comment: What is the frequency of seroconversion during pregnancy for Yellowstone bison and the calves either born to or aborted by these seroconverted bison cows?

Response: It is unknown, although an ongoing study of the epidemiology and pathogenesis of brucellosis in Yellowstone bison should help determine the rate of seroconversion in bison cows and calves. The results of this study are expected after it is completed in 2001.

Representative Comment: 14819I

F Comment: Not enough is known about brucellosis in bison. Therefore, the proposed management actions are not justified.

Response: It is true that much of the epidemiology and pathology of the disease in Yellowstone area bison is unclear. However, some important facts are clear: (1) that transmission of the bacteria from bison to cattle is a biological possibility and has occurred in captivity, (2) that some percentage of the bison herd carries *B. abortus* bacteria, and (3) that at least four abortions apparently related to brucellosis in the herd have been documented in the park. This means that transmission from Yellowstone bison to cattle in the impact area is a possibility, even if the chances of it happening are low. Because the economic consequences of transmission could be severe (see "Socioeconomics: Cost to Livestock Operators" in this volume and volume 1, "Purpose of and Need for Action: Background — Economic Impacts of Brucellosis in Cattle"), the agencies have agreed to maintain separation of potentially infectious bison (and their birth products) and susceptible cattle in the impact area. In other words, we disagree that the proposed management efforts geared to maintain separation are not justified.

Representative Comment: 1587AR

G Comment: The reference on p. 19 of the *Draft Environmental Impact Statement* to the frequency of brucellosis-induced abortions in bison must be a reference to domestic or captive bison, not wild bison.

Response: The sentence preceding the one referenced in this comment does refer to a comparison of chronic brucellosis infections with new outbreaks in cattle and captive bison; it does not refer to wild bison.

Representative Comment: 15420TB

H Comment: When one bison gets brucellosis it is contagious.

Response: A bison with brucellosis may be considered contagious because it carries a disease that is transmitted by direct or indirect contact. However, not every bison with brucellosis is continuously able to transmit the disease to other animals. Transmission depends on many factors, such as whether the bison is shedding the bacteria in numbers and in a manner that is conducive to infection of a susceptible animal. It may depend on whether a female bison is capable of shedding sufficient numbers in milk to infect a calf or on whether organisms from an infected female bison are capable of infecting a calf in utero or during birth. A bison can be capable of transmitting brucellosis at some times and not others. Although male bison may shed small amounts of the bacteria in feces or draining abscesses, the tissues and fluids associated with abortions and live births that are accompanied by shedding of *B. abortus* have by far the largest numbers of bacteria and are the most common sources of transmission.

Representative Comment: 10652B

I Comment: It is well-known and documented that brucellosis in cattle and in bison is the same. The *Draft Environmental Impact Statement* attempts to make the reader think otherwise.

Response: We disagree that the *Draft Environmental Impact Statement* attempts to make the reader think one way or the other. The document is an attempt to lay out all important facts, including where researchers have gaps in the data. Many of the facts of epidemiology and pathogenesis of the disease in bison are as yet not fully understood, and some appear to be different in the two species. The 1998 NAS report (pp. 17–18) acknowledges this, pointing out that "Certainly, *B. abortus* induces disease in bison and elk that differs from the disease in cattle." However, it notes these differences have not been shown "unequivocally to underlie a major difference in pathogenesis that should shift our view of the pathobiology of brucellosis in the species." In other words, until research proves otherwise, it is prudent to assume the disease is transmitted and acts the same way in both bison and cattle. Given this, the agencies believe that bison and susceptible cattle should be kept separated in time and space.

Representative Comment: 11433M

J Comment: Some comments regarding transmission could be added to those made in the NAS report: (1) perhaps low levels of exposure to subinfectious levels of bacteria create some degree of resistance in chronically infected herds; (2) there can be shedding of *Brucella* and risk of transmission with infective births as well as with abortions.

Response: It is true that there can be shedding of *Brucella* and risk of transmission with infective births, as well as abortions, as noted on pp. 16–17 of the *Draft Environmental Impact Statement*. There has long been a belief or speculation that low levels of exposure to subinfectious levels of bacteria create some degree of resistance in chronically infected herds. However, this hypothesis has never been tested experimentally.

Representative Comment: 9364LL

K Comment: The disease, brucellosis, is impacting the natural gene frequency and therefore the genetic make-up of Yellowstone National Park bison.

Response: In order for brucellosis to alter the gene pool of the Yellowstone population, the disease would have to change the reproductive success or survival of specific bison in a nonrandom fashion, thereby favoring particular types of individuals over others on a population-level scale. This has not been demonstrated in the Yellowstone population, which appears to have maintained greater genetic diversity than most other bison populations (Wilson and Strobeck 1997). Because "substantial fetal loss or infertility has not been reported for the bison populations in the Greater Yellowstone Area" (Olsen et al. 1998), it is not likely that brucellosis has exerted any influence on the Yellowstone bison gene pool. One potential impact, however, of brucellosis on the genetics of the Yellowstone bison population is through the management removal of selected individuals based on serologic status, which has the potential to remove specific age and sex classes of bison (P. Gogan, USGS-BRD, unpubl. data), resulting in a skewed age and sex structure that could decrease effective population size and cause nonrandom genetic mixing (Schneider 1997). Refer to "Bison: Population" in this volume for more information on the potential impact of management actions on population genetics.

Representative Comment: 9364I

Issue 9: *Cattle-to-Cattle Transmission*

A Comment: If cattle can give brucellosis to each other, why are only the bison at fault?

Response: The environmental impact statement examines a full range of alternatives, some of which emphasize the management of susceptible cattle and others that focus on managing potentially infectious bison or their birth products. All are geared to prevent intermingling between the two species. While bison are not singled out for management, it is true that only bison and elk in Montana carry brucellosis. Cattle are free of the disease, as they are in all surrounding states and in nearly all of the United States. When brucellosis is eliminated from the remaining affected livestock herds in the U.S., wildlife in the Greater Yellowstone Area will then be the last remaining reservoir of the disease (NAS 1998).

Representative Comment: 186B

B Comment: If a cow tests positive for brucellosis, how do you know it came from bison and not other cattle? Some ranchers have had brucellosis in their herds that did not originate from bison.

Response: Current laboratory technology cannot determine the origin of *B. abortus* isolated from a particular animal. Therefore, when brucellosis is diagnosed in a cattle herd, a complete epidemiological investigation takes place to determine the origin of the disease. This investigation uses many techniques, including (but not limited to) testing adjacent herds and reviewing herd history records (such as where

animals came from and went to, and when; contact with other herds; vaccination history; management methods; herd health records). Some possible conclusions of the investigation are that the disease was a recrudescence (i.e., disease was present in a herd that originally had the disease but was thought to be free of it), it came from other cattle or captive bison, or it came from wildlife.

Representative Comment: 4606B

Issue 10: ***Disease Control***

A Comment: There is no good way to control the spread of brucellosis.

Response: The spread of brucellosis in cattle has been effectively eliminated in the U.S. and several other countries through the use of quarantine procedures, movement regulations, depopulation, or testing and slaughter of infected animals with follow-up testing, vaccination, and other herd management practices. Some states and countries that began with a 50% or higher prevalence have become free and remained so for many years through the national brucellosis eradication program. In the case of Yellowstone area bison, the value of this last remnant of the indigenous wild herds of North America (see DEIS, p. 189) prevents the extensive management practiced on domestic cattle herds. Instead, each alternative considered manages potentially infectious bison and/or susceptible cattle to prevent their intermingling and to prevent cattle from coming in contact with environmental contamination. Through the use of spatial and temporal separation, transmission through direct contact or environmental contamination can continue to be prevented.

Representative Comment: 350E

B Comment: An effective disease control program is not set forth in the *Draft Environmental Impact Statement*.

Response: We disagree. Every alternative controls brucellosis by effectively preventing transmission between bison and cattle (through spatial and temporal separation) while maintaining a wild and free-ranging herd of bison. The elimination of brucellosis from wildlife is not an objective of this plan, as noted in "Purpose of and Need for Action: Objectives and Constraints — Objectives in Taking Action," objective 4 in volume 1.

Representative Comment: 9043B

C Comment: One commenter recalled that, at his suggestion, a farmer in Ecuador put fish scraps on his field, and three months later his herd was pronounced free of brucellosis and milk production increased 78%.

Response: These occurrences are strictly coincidental and do not have a cause-and-effect relationship. There is no known mechanism by which placing fish scraps on a field would lead to the elimination of brucellosis from an affected livestock herd.

Representative Comment: 448B

Issue 11: ***Brucellosis Eradication***

A Comment: Total elimination of brucellosis from Yellowstone is impossible, either because of the influence of other infected elk and wildlife, inadequate technology, expense, or the public relations nightmare that killing thousands of bison would cause. The 1998 NAS report (p. 7) says eradication of brucellosis is more a statement of principle than a workable program at present; neither sufficient information nor technical capability is available to implement a program for wildlife in the Greater Yellowstone Area.

Response: As noted in the *Draft Environmental Impact Statement* (p. 29, objective 4), the agencies state that the "elimination of brucellosis, even in bison, is not within the scope of the management plan." This section goes on to note that one of the reasons elimination of the disease is not an objective is that elk in the Greater Yellowstone Area carry brucellosis and may transmit it to bison. Modelling predicts that alternatives 5 and 6 would result in significant decreases in seroprevalence (to near-zero) in bison through a parkwide capture, test, and slaughter program. As the comment correctly notes, accomplishing this decrease would require killing thousands of seropositive bison over a three-year period (see DEIS, pp. 214–220). Of those who expressed an opinion on alternative 5 or 6, 98% expressed opposition and 2% expressed support (NPS , unpubl. data), indicating that a "public relations nightmare" is a possibility if either of these alternatives was implemented. Expenses to implement either of these alternatives would be high, but not infeasible (see DEIS, table 10). Technology is also available. However, these alternatives would only temporarily eliminate or nearly eliminate seroprevalence in the Yellowstone bison herd, and not in wildlife in the Greater Yellowstone Area. Elk would continue to be a reservoir of potential reinfection. If brucellosis was to be eliminated in the Greater Yellowstone Area, it could entail an area-wide capture, test, and slaughter program for 120,000 elk and/or the closure of 22 elk feeding grounds in Wyoming. This might be significantly more challenging, both technically and economically, than either alternative 5 or 6. (See "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information).

Representative Comment: 15363P, 469C, 563B, 14819I, 15363P, 8624A

B Comment: Eliminating brucellosis from the Yellowstone bison herd would require a disciplined, scientific approach. Basic science and good judgment have been used to eliminate brucellosis from numerous bison herds without decimating the herd or gene pool.

Response: As noted above, the eradication of brucellosis from bison is not an objective of this planning effort.

Representative Comment: 9043D

C Comment: APHIS could modify its regulations to explicitly state the eradication goal applies only to livestock, not to wildlife.

Response: This is already true, as current APHIS brucellosis regulations apply only to captive cattle, bison, and swine.

Representative Comment: 14819I

D Comment: The only way to preserve a free-roaming bison herd and to meet the objectives of the agencies preparing the environmental impact statement is to eliminate brucellosis from wildlife in and around Yellowstone National Park.

Response: We disagree. As noted above, eliminating brucellosis in bison or other wildlife is not an objective of the plan. All alternatives meet the purpose of taking action, that is, to maintain a wild, free-ranging population of bison and to address the risk of brucellosis transmission from bison to domestic cattle in the impact area in order to protect the economic interest and viability of the livestock industry in Montana. We believe these objectives can be accomplished by continuing to keep potentially infectious bison and susceptible cattle separated in time and space.

Representative Comment: 14820A

E Comment: Objective 4 (commit to the eventual elimination of brucellosis in bison and other wildlife) is inappropriate for several reasons, and the elimination of brucellosis is not a goal worth pursuing at this time. Others stated that the environmental impact statement should include a realistic attempt to eliminate brucellosis, noting that without eradication, bison could not be tolerated anywhere there is a risk of

intermingling with livestock. None of the alternatives eradicates brucellosis. Eradication should be a long-term goal of the final environmental impact statement.

Response: As noted above, the elimination of brucellosis in bison or other wildlife is not an objective of the plan. We believe the risk of brucellosis transmission from bison to cattle in the impact area can be eliminated by maintaining the spatial and temporal separation of potentially infectious bison and susceptible cattle. Objective 4 refers to the federal agencies commitment to eliminate brucellosis from Greater Yellowstone Area wildlife. Although the final plan will not eliminate the disease from Greater Yellowstone Area wildlife, each alternative does contain elements that work toward that end and would ultimately facilitate elimination of the disease in bison. Those elements are listed for each alternative in table 9 of the *Draft Environmental Impact Statement* and include vaccination of bison, for example.

Representative Comment: 15874aM, 16558C, 15370P, 14832C, 9229A, 15543DI

F Comment: Brucellosis must be eradicated from Yellowstone National Park as well as from the rest of the United States. Although the risk of transmission from bison or elk to cattle is relatively small, the huge investment made by all other states and territories in eradicating the disease must be protected. Without total elimination of brucellosis from wildlife in the park, the economic well-being of ranchers in surrounding states will be in jeopardy.

Response: We believe the risk of transmission from bison to cattle in the impact area can be eliminated through the use of spatial and temporal separation to prevent direct contact with susceptible cattle or contact with environmental contamination from infectious bison. Brucellosis does not have to be eliminated to eliminate the risk of transmission between bison and cattle (refer to issue 1D above for more information).

Representative Comment: 14431A, 14932A

G Comment: The control or eradication of brucellosis in elk is identified as a topic that was precluded from further analysis. The rationale given suggests that it is the eradication of brucellosis from bison that is not part of the management plan, particularly because the issue of brucellosis in elk is identified later on as a topic beyond the scope of the *Draft Environmental Impact Statement*.

Response: The comment is correct. Eradication of brucellosis from bison is not part of the management plan. Commitment to the eventual elimination of brucellosis from bison and other wildlife in the Greater Yellowstone Area is a part of the proposed management plan. Although brucellosis eradication from bison and other wildlife is not part of the management plan, it remains a long-term goal of the federal government, as reflected in agreements signed by Secretary of Agriculture Dan Glickman and Secretary of the Interior Bruce Babbitt, and as reflected in objective 4 in the environmental impact statement (DEIS p. 29).

Representative Comment: 15420TB

H Comment: Some people do not know why APHIS has targeted brucellosis for eradication because there are many disease threats to livestock and humans. Others note the disease is serious for livestock and humans.

Response: Brucellosis is a serious disease of livestock and humans, and the knowledge and technology exist to eradicate the disease; these are the reasons that APHIS has targeted it for eradication.

Representative Comment: 7555B, 11057E

I Comment: The U.S. will not be free of brucellosis by the year 2000. It will reappear by 2001 whether or not cattle are in contact with brucellosis-infected wildlife.

Response: This comment may be correct. However, eventual eradication from domestic cattle is certain, and wildlife will eventually remain the sole reservoir.

Representative Comment: 14882E

Issue 12: ***Brucellosis Transmission from Cattle to Bison***

A Comment: Shoot the cattle because they might transmit brucellosis to bison.

Response: Current surveillance testing indicates that the cattle population around Yellowstone National Park is free of brucellosis and is, therefore, not a threat of transmission to wildlife.

Representative Comment: 3494A

B Comment: It is the livestock that transmit brucellosis to the bison. Livestock should be kept away from land used by bison.

Response: It is likely that brucellosis was originally transmitted from cattle to bison. However, as noted above, cattle in the impact area, and in most of the rest of the United States, are now free of brucellosis. Spatial and temporal separation between bison and cattle will eliminate the risk of transmission, and as the commenter notes, keeping cattle away from bison is one option for preventing contact. Alternative 2 uses this approach and attempts to remove susceptible livestock from the impact area.

Representative Comment: 6797A

Issue 13: ***Brucellosis and Other Wildlife Species***

A Comment: Some black bears and grizzly bears have had positive brucellosis serological tests. The *Draft Environmental Impact Statement* does not assess the impact of the disease on these species or the potential of these species to transmit brucellosis to cattle or to other wildlife species.

Response: The commenter is correct. Both grizzly and black bear populations in the Greater Yellowstone ecosystem have been found to contain individuals testing positive for the presence of the antibodies to brucellosis (NAS 1998, p. 41; see "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information). Bears and other carnivores are dead-end hosts for the disease; that is, they do not transmit it. According to the 1998 NAS report (p. 52), the only brucellosis transmission pathway of possible concern to cattle from predators and scavengers would be through dragging carcasses to cache or den sites, although even bacteria spread in this fashion are likely to be killed by appropriate environmental conditions before cattle are brought on site to graze in June (Kurz 1999a). Bears are not known for transporting carcasses and usually feed on site. Bear cubs follow their mothers and feed on site as well (NAS 1998, p. 52). According to the NAS report scientists who studied the potential role of carnivores in transmission of brucellosis to cattle, bison, or elk, "known carnivore behavior makes the existence of a healthy complement of predators almost certain to be a major factor in reducing the probability of *B. abortus* transmission within the wildlife community, and between wildlife and domestic stock" (NAS 1998, p. 51). The report goes on to say that carnivores "biologically decontaminate the environment of infectious *B. abortus* with an efficiency unachievable in any other way."

Representative Comment: 9364DD

B Comment: The *Draft Environmental Impact Statement* does not adequately address the risk of brucellosis transmission to predators such as coyotes, lynx, weasels, and skunks that consume aborted fetuses and afterbirth.

Response: Assessing the risk of transmission of brucellosis in scavengers is beyond the scope of this environmental impact statement. However, the effects of brucellosis-related management actions on

predators and scavengers, in general, is included in the environmental impact statement. These species are thought to be dead-end hosts, i.e., that they do not serve as reservoirs for the disease. They generally suffer no debilitating effects from the disease (see issue 15C), nor are they able to spread it except as described above.

Representative Comment: 14904D

C Comment: Wolves and coyotes can become infected, then spread the disease, after consuming aborted bison and elk fetuses. If a Yellowstone-Yukon wildlife corridor is established, infected wolves could carry brucellosis to Canada. Brucellosis from bison also threatens horses and dogs. Infected wolves and coyotes can carry the disease to horses, dogs, and cattle.

Response: Coyotes can shed bacteria for a short time if infected, and under confined conditions in one experiment have spread the disease to three of 24 cattle in the pen, with 10 purposefully infected coyotes (NAS 1998, pp. 38, 50). Researchers speculated that cattle became infected through contact with the urine or feces of coyotes. However, as noted in the 1998 NAS report, this experiment involved unnatural confinement at artificial densities that would never occur on the open range, as cattle would avoid coyotes under natural conditions (NAS 1998, p. 50). Also, cattle, bison, and elk would not be attracted to urine and feces from predators, and would not be likely to come into contact with them by chance (NAS 1998, p. 51). Coyotes and other predators and scavengers do not show the same clinical signs of abortion and abnormal birth as bison, cattle, and elk when infected with the bacteria. Because of these important differences with cattle, bison, and elk, predators and scavengers are considered dead-end hosts for the disease, both within and among species. Notably, many states have eradicated brucellosis from cattle in the midst of an abundance of carnivorous predators, including coyotes. The NAS report did examine the possibility of spreading bacteria from aborted fetuses of elk or bison through caching or dragging infected carcasses to dens to feed young. It concluded that coyotes, wolves, and bears are not likely to spread bacteria through these activities, but that red foxes may do so since they display well-developed caching behavior (VanderWall 1990, NAS 1998, p. 52). The report concluded this would spread bacteria only locally, with only small pieces of tissue (a few kilograms or less), which were most likely to be muscle and bone (as opposed to infected reproductive tissues), and not long distances as the commenter claims. Transmitting infection from these earthen caches to bison, cattle, or elk would be "unlikely." As noted above, the report also surmised the advantage of sanitary activities of carnivores "greatly outweighs" the possible negative effects of dragging infected meat.

Representative Comment: 10616B

Issue 14: ***Risk Analysis***

A Comment: The *Draft Environmental Impact Statement* does not analyze the impact of the spread of brucellosis from bison to cattle, and the resulting impacts to the affected producer and cattle industry of Montana. Because of the nature of the disease, detection may be delayed and a number of herds in several states or even foreign countries receiving exported cattle could be impacted before the disease was discovered. Such an impact must be carefully analyzed before a final alternative is selected. The value of the livestock industry to the two impacted counties is discounted, as is the cost to ranchers to mitigate the threat of transmission from bison. The *Draft Environmental Impact Statement* should evaluate the probabilities of an outbreak under each alternative; it should estimate and disclose the consequences of such an outbreak.

Response: The *Draft Environmental Impact Statement* includes an extensive discussion of the potential economic impact to the Montana livestock industry of the spread of brucellosis to cattle (see pp. 22–26). Additional information on these possible effects is presented in the impact discussion (p. 234). Impacts on individual producers are discussed on pp. 233–244, as well as on pp. 246–265. In "Socioeconomics: Costs to Livestock Operators" in this volume, the cost incurred as a result of the loss of class-free status (from a *brucellosis* outbreak in cattle in Montana) is laid out in more detail. Much of the information referenced above is geared to assess possible economic damage from an unchecked outbreak. For such an outbreak to

occur, susceptible cattle (that is, female and in the 30%–35% of the population for which vaccination is ineffective) would need to intermingle with infectious, pregnant bison or have contact with their birth products. This means that they must be near enough that they could lick the fetus before the female bison sanitized the site, or a predator or scavenger carried the fetus away. In a normal birth event in May, the length of time until the bacteria were killed is expected to be much less (in a recent study in Wyoming, bacteria remained viable no longer than five days in May) than in the case of an abortion in winter where the bacteria could remain viable for up to 60 days if not exposed to sunlight or unfavorable temperatures; however, cattle must be grazing in the vicinity of the bison. This would be highly unusual in the impact area, as forage used by cattle would be covered by snow or ice, or nutritionally deficient. Susceptible female cattle that had been allowed to intermingle with bison would either need to be tested before they were exported, or be incubating the disease and not yet showing signs of developing an immune response. These same cattle would need to become pregnant and give birth or abort while still showing no obvious sign of infection and in the vicinity of other cattle. The chances of each of these occurring is quite low, and the chance of all occurring is even lower. This is why researchers report the risk is very small, even when the two groups are in the same area under free-ranging conditions. However, all alternatives in this environmental impact statement include means to prevent commingling and to ensure that cattle are not exposed to the same environment where bison have grazed in the winter until environmental conditions have destroyed all bacteria on vegetation or soil in the environment. Many of the alternatives include additional measures to eliminate risk (such as vaccination, capture, test, and removal to quarantine or slaughter, or population control measures). However, since the Montana state veterinarian would decide each year when the appropriate "cattle on" date is, and since the agencies are committed to using the measures described in the alternatives to maintain spatial separation, separation is extremely unlikely to fail. Each alternative would protect livestock from the risk of brucellosis." In other words, under normal conditions the risk is eliminated and the economic consequences described in the *Draft Environmental Impact Statement* are not expected to take place. This does not change from alternative to alternative.

Representative Comment: 9364Y

B Comment: There is an inconsistency in the *Draft Environmental Impact Statement* regarding the risk of brucellosis transmission from bison to cattle versus elk to cattle. The 1998 NAS report states that both bison and elk carry brucellosis. The *Draft Environmental Impact Statement* states that no risk assessment has been done. However, it also states that transmission risk from bison to cattle is very low, but for elk to cattle is unlikely in a natural setting. There appears to be insufficient information to make such a statement. If there is no scientific evidence that risk of transmission to cattle is greater with elk or bison, and elk and bison are intermingling with cattle in the same geographic area of concern, then the preferred alternative will not reduce the risk of brucellosis transmission to cattle.

Response: In the particular impact area described in the *Draft Environmental Impact Statement*, only about 1%–2% of the elk population have tested seropositive, as opposed to 50% of bison in the area. In addition, as described above in issue 5 (see A and C, for example; also see "Wildlife: Brucellosis in Other Wild Ungulates"), it is known that female elk move away from the herd to give birth and meticulously clean the site of all potentially contaminated tissues, fluids, vegetation, etc. While ongoing research suggests bison mothers may also clean the site after giving birth or aborting, it is also known that they give birth near the nursing herd. This behavior may increase chances of infection among bison, as well as between bison and cattle, as birth sites and bacteria (if any females are infected) may be more concentrated and attractive to cattle. We cannot speak for the National Research Council, but we believe this is an accurate summary of the argument laid out in the 1998 NAS report (pp. 47–49).

Representative Comment: 14356F. 14356N

C Comment: SMAs will significantly increase the area affected by brucellosis-infected bison and are likely to increase the risk of transmission.

Response: First, not all of the bison leaving Yellowstone National Park are necessarily infected or infectious, as responses to issues 1D and 4F above (among others) indicate. Second, although allowing

bison into winter range in SMAs outside the park would indeed increase the area over which this wild and free-ranging herd can roam, we do not believe that it would increase the risk of transmission, since any potentially infectious bison would be kept separate from susceptible cattle in all alternatives (see response to issue 1B, for example, for more information on risk). In addition, any slight risk that environmental contamination might have posed is expected to be eliminated by waiting a minimum of 30 days before cattle are returned to the area in June. Justification for the minimum of 30 days comes in part from recent research in Wyoming. This research found that *B. abortus* bacteria did not survive in bovine fetuses for more than five days in June, even if not exposed to sunlight (Cook 1999), which killed the organisms in a matter of hours.

Representative Comment: 14816

D Comment: There should be a moratorium on killing bison until a thorough analysis of risk is performed.

Response: A great deal of ongoing research to more narrowly determine the risk of wild and free-ranging bison transmitting brucellosis to domestic cattle will be completed in the next 1 to 3 years (please see DEIS, appendix D, for a complete list of research projects). However, in the meantime it is known that bison and cattle both can transmit the disease in the same manner, and have done so across species under experimental conditions. The agencies must assume this could also happen under free-ranging conditions until research shows otherwise; so they have included actions in each alternative to keep potentially infectious bison and susceptible cattle separated in time and space. Some of these alternatives minimize lethal controls, although all include them to some extent.

Representative Comment: 15579A

Issue 15: ***DEIS Alternatives or Those Proposed by Others***

A Comment: State veterinarians want to test and slaughter bison and elk inside Yellowstone National Park. They will kill all positive bison, even those that cannot spread brucellosis.

Response: The agencies received a comment letter from the U.S. Animal Health Association (USAHA), an organization that includes many state and federal animal health authorities plus livestock industry representatives. This association has proposed an altered version of alternative 6, which includes immediate vaccination of bison calves, different standards than those proposed in *Draft Environmental Impact Statement* for when to begin vaccination of adult bison, the elimination of the western SMA, and several other changes (see "Alternatives: New Alternatives and Issues" in this volume). Alternative 6 does depend on a parkwide capture, test, and slaughter program for bison (not elk) after a 10-year vaccination program for bison has taken place. The Animal Health Association also proposes the parkwide capture, test, and slaughter operations of bison (not elk) after a five-year vaccination program has been completed. In both, all seropositive bison would be killed. The commenter is correct in noting that some seropositive bison are not capable of transmitting the disease, but the number that cannot spread brucellosis is unknown, and there is no practical and dependable way to identify those animals.

Representative Comment: 10302A

B Comment: Alternatives 2, 3, and 7 should not be supported because they do not provide any movement toward disease eradication or prevention they place the cattle industry of Montana and surrounding states at greater risk for disease transmission and potential loss of class free status from APHIS.

Response: We disagree. All alternatives, including 2, 3, and 7, provide for the vaccination of bison with a safe and effective vaccine. This clearly moves toward eradication and displays a commitment toward the elimination of brucellosis which is one of the objectives of the planning effort (objective 4, p. 29, DEIS). Eradication itself is not a goal of this planning effort (see issue 5J above, for example). Protecting cattle in the impact area from the risk of transmission by bison is also a goal of the bison management plan, and every alternative meets it (see DEIS, p. 29, objective 5). None of the alternatives would place Montana or

surrounding states at greater risk for disease transmission, as all would require the temporal and spatial separation of potentially infectious bison or birth products from susceptible cattle. Without contact, cattle are not in danger of becoming infected with brucellosis. The agencies, including APHIS, recognize this in agreeing that any of the alternatives "would be sufficient to prevent the actual outbreak of disease in domestic livestock," (see DEIS, p. 58). APHIS would not change the current class-free status of Montana if the agencies chose to implement any of the alternatives in the environmental impact statement, even those that would allow bison outside Yellowstone National Park.

Representative Comment: 14886G

Issue 16: ***Brucellosis Not a Disease Issue***

A Comment: The brucellosis issue is political and about money, rather than disease transmission. Others argue it is only an excuse to reduce the bison population and note that elk are not killed although they carry the disease.

Response: Certainly, brucellosis in cattle in the United States and other countries is targeted for elimination because of its debilitating effects on livestock and the potential for infections in humans; in other words, because it is a disease issue. The U.S. has invested billions of dollars in the program to eliminate it, as have many other countries. APHIS, the agency in charge of this eradication effort, indicates it has very nearly achieved the goal of eradication in cattle in the U.S. Brucellosis transmission from Yellowstone bison to cattle would have economic effects on Montana livestock growers, so it may be that the brucellosis issue is partly about money. It is also true that elk are an important source of recreation-related revenues, in terms of hunting and viewing opportunities, in the Greater Yellowstone Area (NAS 1998). However, although the commenter is correct in noting that some Greater Yellowstone Area elk do test seropositive, reasons for differences in management focus on differences in seroprevalence and behavior that decrease the risk of transmission (see issue 5 above and "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information).

Representative Comment: 15191B

B Comment: The actual mission of the plan is to continue subsidized livestock grazing on public lands and to provide ranchers with a risk-free business from all threats, whether real or perceived.

Response: The "actual mission" of the plan is stated in the *Draft Environmental Impact Statement* on p. 11 and pp. 28–30. As noted above (see issue 2), transmission is a biological possibility as demonstrated experimentally. The objective of this plan is to manage the already low risk through spatial and temporal separation of potentially infectious bison or birth products and susceptible cattle.

Representative Comment: 13464D

C Comment: The American people know that beneath the excuse of brucellosis lies the agenda of removing competition for cattle on public lands.

Response: We do not believe this is true. As noted in the response to issue 1A above, only 761 of 2,019 cow/calf pairs on all public and private land would be affected at all in alternative 2, where the largest area outside Yellowstone National Park would be available to bison. Only a portion of these cow/calf pairs occupy public lands and so are "in competition" with bison for forage. Rather, the agencies considered the threat of transmission of brucellosis to or through these cattle to other cattle, the economic impacts on cattle producers, and the Brucellosis Eradication Program when they developed the alternatives in the *Draft Environmental Impact Statement* and the modified preferred alternative in the final environmental impact statement.

Representative Comment: 16725E

Issue 17: ***Education on the Brucellosis Issue***

A Comment: Why is not an educational component considered for each alternative? This sub-component could have major implications on the perception of the status of brucellosis in bison, the efforts by all agencies to ensure that transmission does not occur, and it could assure the public that the agencies can work together to ensure the viability and vitality of both the bison population of Yellowstone and the livelihood of the ranchers. A focused educational effort will dispel the misconceptions of other states and other state vets about the reality of the Yellowstone situation. Additionally, education can bring public participation into play in other states that may arbitrarily and capriciously sanction Montana's cattle. If the residents of states outside Montana understand the responsible actions Montana and the federal agencies are taking to manage the disease, they can participate locally and inform their own state vet of the inappropriateness of sanctions and work to remove all threats of sanctions from their state.

Response: We agree, and believe the commenter has made an important point. To the extent that sanctions imposed by other states are based on misconceptions, APHIS animal health professionals have agreed to work with them to answer questions and alleviate concerns. We also agree that education focused on local ranchers could greatly increase landowner tolerance, and possibly reduce political pressure to increasingly employ lethal measures to manage or even eradicate brucellosis. This environmental impact statement process is one means to increase the flow of correct information, because the National Environmental Policy Act requires impact documents to summarize scientifically valid data for the public and encourages review and critique by all who are interested and affected. We believe public review is as important as presenting the information, and hope all individuals, organizations, and agencies who would like to be involved take the time to read this and other relevant material.

Representative Comment: 14819FF

B Comment: Objective information on brucellosis needs to be provided to the public. Some ranchers have had brucellosis in their herds but it did not originate from bison.

Response: We agree. This is the point of the NEPA process, and the agencies have worked together to ensure the most up-to-date, relevant, and scientifically valid information is presented in the environmental impact statement. However, as noted in the *Draft Environmental Impact Statement*, there is substantial disagreement in the scientific community on the interpretation of existing data. It is the job of the environmental impact statement to present both sides of the debate, if both are grounded in scientific fact. We believe, through responding to comments and making changes in the text to reflect these responses, that the final environmental impact statement does this.

Representative Comment: 8871B

C Comment: Parts of the NAS report should be included and made available to the public.

Response: The 1998 NAS report is available to the public in final form by contacting National Academy Press (http/www.nap.edu; phone 800-624-6242). Sections that the agencies believe illuminate issues associated with the bison management/brucellosis transmission issues are referenced in the final environmental impact statement.

Representative Comment: 14819J

Issue 18: ***Miscellaneous***

A Comment: The responsibility for preventing brucellosis in livestock should be the responsibility of the livestock producers, not the taxpayers.

Response: Livestock producers share in the responsibility by bearing the cost of vaccination and good herd management practices and by paying taxes. However, eradicating or controlling the spread of

brucellosis also benefits the general public, by ensuring the availability of safe milk and preventing brucellosis transmission to humans through contact with contaminated animal births, birth tissues, and carcasses.

Representative Comment: 6836A

B Comment: If the *Brucella* organism can be frozen in snow over the winter and come back to life in the spring, why is there not research on how the organism can do this? Then people with terminal illnesses could be frozen until cures are found.

Response: There are many differences between single — cell bacteria — such as *B. abortus* — and vertebrates, including the ability to survive freezing temperatures. Unlike vertebrates, the *Brucella* organism does not die when frozen, but must be exposed to high temperatures, sunlight, or other harsh environmental conditions to be destroyed.

Representative Comment: 1611C

C Comment: The prevalence of other diseases needs to be evaluated. Rounding up bison in stampeding/herding drives may cause abortions.

Response: Although there may be merit to knowing the prevalence of other diseases, it is not related to the subject of this particular planning effort, and so is not within the scope of this environmental impact statement. Abortions are very unlikely to occur from roundups. However, it is likely that there will be physical injuries. These are addressed in the environmental impact statement (see pp. 56–57 in the DEIS).

Representative Comment: 2082E

D Comment: Federal law will not allow the interstate shipment of diseased animals, except perhaps to slaughter.

Response: This comment is correct. Currently, title 9 ("Animal and Animal Products"), *Code of Federal Regulations*, part 78 ("Brucellosis"), subpart C ("Restrictions on Interstate Movement of Bison Because of Brucellosis"), governs the restrictions on the interstate movement of bison because of brucellosis. Generally, no provisions have been made to move brucellosis-exposed or reactor bison from the impact area to places other than recognized slaughtering facilities, quarantined feed lots, or other approved destinations. The regulations would have to be changed to allow other interstate movement of such bison. Such regulations are in place because brucellosis-infected animals must be considered to pose a risk of transmitting the disease to cattle or other livestock. These animals should not be moved to private lands, as they may cause the disease to spread in new, previously clean communities. Brucellosis is almost eliminated in the U.S. It would not be prudent to move these animals out and possibly reinfect states or areas that are currently brucellosis free.

Representative Comment: 15316B

Brucellosis Risk Management (BI-52)

Issue 1: ***Risk of Transmission***

A Comment: Quantify the risk of transmitting *B. abortus* from bison and elk to cattle using available data.

Response: The risk of transmission cannot be determined with precision based on current knowledge because the risk is too small to measure accurately (NAS 1998). As noted on p. 19 of the *Draft Environmental Impact Statement*, it is not possible to quantify the risk of *B. abortus* transmission from Greater Yellowstone Area bison and elk to domestic livestock because most of the variables that define risk are unknown. The risk of transmission is determined largely by the number of abortions that occur, the presence and survival of *B. abortus* in placenta, and the exposure of a susceptible host (NAS 1998). The detection of transmission from an infected animal to a susceptible domestic cow is made difficult by a lack of clinical signs in infected cattle, geography, weather, predation of the placenta and fetus, and birthing characteristics of the infected animals. Those and other factors complicate determination of risk. Almost no controlled field studies have been done concerning transmission between wildlife and cattle, and most of the current knowledge about brucellosis has been gained from studying the disease in cattle and captive bison. Consequently, the true prevalence of brucellosis in Greater Yellowstone Area bison and elk is unknown, the number of abortions or fetal deaths in Greater Yellowstone Area bison since 1917 is unknown except for a few cases, and other factors affecting the frequency with which cattle are exposed to the disease are unknown.

Representative Comment: 14714AA, D, M, X, 15671I

B Comment: Determine and manage the risks associated with brucellosis using available data and scientific analyses and research.

Response: A comprehensive risk assessment has not yet been conducted. Existing models of the elk, bison, and brucellosis dynamics need further development and refinement; and there are no comprehensive models that can be used to quantitatively evaluate brucellosis control strategies in the Greater Yellowstone Area or to assess the likelihood of management success (Gross et al. 1998). Although it is not possible to quantify the risks of transmission with a single number (see issues 1A and C), it may be possible in the future to determine the bounds of risk using existing information (J. Gross, Colorado State University, pers. comm.). In other words, it may be possible to quantitatively determine when and where cattle in the Greater Yellowstone Area would be at risk and how management actions could reduce risks. A team of researchers from Colorado State University, the Colorado Division of Wildlife, and the Wyoming Game and Fish Department have proposed to quantitatively analyze existing data to develop models that forecast the dynamics of brucellosis, that identify the most effective management strategies in the face of uncertainty, and that provide clearer guidance to help control or eradicate brucellosis throughout the Greater Yellowstone Area. To achieve these goals, they proposed to (1) collect, analyze, and synthesize information needed to simulate dynamics and place this information into GIS and relational databases that can also be used by citizens or agencies to confirm the analyses or conduct additional analyses, (2) expand and refine their existing model of brucellosis dynamics and integrate the model with the database, (3) assess management actions that incorporate costs and uncertainties, and (4) develop optimal and adaptive management strategies (Gross et al. 1998). This study is being sponsored by the U.S. Department of Agriculture. (However, only part of the study will be completed in the near future because of recent funding cuts [J. Gross, Colorado State University, pers. com., June 24, 1999]).

Representative Comment: 15123aB, 15725C, 14623F

C Comment: The goal of the vaccination/test/slaughter program is to "reduce the risk to near zero." The risk is already so small that the 1998 NAS report describes it as too small to measure accurately. How can the agencies manage the risk when the level of risk is unknown?

Response: The 1998 NAS report found that the risk of bison or elk transmitting brucellosis to cattle is small, but it is not zero. However, the risk of transmission cannot be determined with precision based on current knowledge because the risk is too small to measure accurately. The report also indicated that although the risk of transmission is low, it can be reduced further with a combination of management options. The environmental impact statement acknowledges that while it is not possible to quantify the risk of transmission, it is possible to identify the various factors that affect risk and to qualitatively evaluate how alternative management approaches affect those factors (see volume 1, "Purpose of and Need for Action: Background — Risk of Transmission"). Both the NAS report and the environmental impact statement describe various management options for further reducing the risk of transmission.

Representative Comment: 14819TT

D Comment: Conduct a risk analysis to determine the consequences of some cattle contracting brucellosis.

Response: See the responses to issues 1B and 1C above. Under all the management alternatives, contact between bison and cattle would not occur, and therefore the disease would not be expected to spread. In other words, the consequences of some cattle contracting brucellosis is expected to be nonexistent under all the alternatives. Therefore, a risk analysis was not needed to determine the consequences of some cattle contracting brucellosis. However, because the potential for transmission if cattle and bison intermingle is one of the reasons that action is proposed, a discussion of the economic impacts of brucellosis in cattle is presented in several places in the document (see, for example, volume 1, "Environmental Consequences: Impacts to Socioeconomics" or in this volume "Socioeconomics: Costs to Livestock Operators").

Representative Comment: 15725C

Issue 2: *Risk of Transmission in the Wild*

A Comment: The *Draft Environmental Impact Statement* failed to present evidence that there is a risk of transmission related to cattle and bison sharing the same range. There are no documented cases of transmission between cattle and bison in the wild.

Response: There is no evidence based on controlled research that transmission of brucellosis between cattle and bison has occurred in a natural setting within the Greater Yellowstone Area. However, epidemiological evidence suggests that transmission between free-roaming wildlife (probably elk) and cattle may have occurred on Wyoming premises within the Greater Yellowstone Area at least six times in the past (NAS 1998; GYIBC 1997; and DEIS p. 20). These six cases of purported transmission from wildlife to cattle are based on circumstantial evidence. The only thing definite in these six cases is that cattle tested positive for brucellosis. It was not clearly determined that elk or bison were the source of the infection in these cases (NAS 1998). Despite the lack of definitive evidence, regulatory officials did conclude that wild elk or bison were the probable source of *B. abortus* infection for cattle in these six cases (GYIBC 1997).

Representative Comment: 7319C, 15671I

B Comment: Even if brucellosis were eradicated from bison, elk could still be a potential source for reinfection. Include elk and other wildlife that may transmit brucellosis in the analysis.

Response: The potential of elk to reinfect bison is discussed in volume 1, "Environmental Consequences: Impacts on Bison Population — Methodologies for Analyzing Impacts." Additional information on brucellosis in elk and the potential to transmit the disease is available in volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison (Brucellosis in Other Wild Ungulates)" or in this volume, "Wildlife: Brucellosis in Other Wild Ungulates."

Representative Comment: 15671I

Issue 3: ***Information on Risks Used in the Draft Environmental Impact Statement***

A Comment: The *Draft Environmental Impact Statement* attempts to discredit current knowledge of brucellosis and the associated risks without the research to backup the claims.

Response: As discussed on p. 20 of the *Draft Environmental Impact Statement*, there is considerable disagreement about the significance of brucellosis in bison, especially the degree to which bison pose a risk of brucellosis transmission to livestock. In addition, very few controlled field studies have been done that help define the risk of transmission between wildlife and cattle in the Greater Yellowstone Area. Therefore, the final environmental impact statement presents alternative interpretations of the existing information about the possible risks of transmission. The final impact statement does not attempt to discredit the current knowledge of brucellosis and the associated risk.

Representative Comment: 10638K

B Comment: The agencies failed to acknowledge the existence of several data sets that are relevant to evaluating the risk of transmission. This is the best scientific data available.

Response: See "Bison: Brucellosis Testing" and "Bison: Brucellosis Transmission and Public Perception" in this volume for an updated discussion of seroprevalence and culture positive bison using these data.

Representative Comment: 14714X

Issue 4: ***Genetic Resistance and Risk***

A Comment: Many individual bison have developed brucellosis resistance; this trait should be promoted, not removed, as will happen under the preferred alternative.

Response: It may be possible to promote genetically based natural resistance as one component of brucellosis control. However, additional studies are needed to determine how many bison, if any, in the Greater Yellowstone Area are naturally resistant to brucellosis and the possible utility of natural resistance to brucellosis in a control program. Researchers at Texas A&M University have studied the natural resistance to brucellosis in cattle. They selected crossbred females randomly from a population of cattle and determined using the best means possible that they had not ever been exposed or vaccinated for brucellosis. They challenged these females at midgestation (the most vulnerable time) with a potent, virulent *B. abortus* challenge and determined that 20% (30/150) showed no signs of infection and had a normal delivery of healthy calves. None of these animals developed any positive serological tests used for brucellosis diagnosis. The researchers rechallenged these cows on subsequent pregnancies and they were still resistant to the challenge infection. When a naturally resistant bull was bred to susceptible cows, approximately 38% of their progeny were naturally resistant to the same challenge infection. If a naturally resistant bull was bred to naturally resistant cows, approximately 57% of their progeny were naturally resistant to the same potent challenge of virulent *B. abortus.* The researchers identified one of the two or three genes that control natural resistance to brucellosis in cattle. This gene is called natural resistance associated macrophage protein1 or NRAMP1 (Joe Templeton, Texas A&M Univ., pers. comm.). The Texas A&M University researchers also studied natural resistance to brucellosis in bison (not GYA bison), and they found to date that about 10% of bison challenged as per the domestic cattle *B. abortus* protocol are naturally resistant to brucellosis. Additionally, they have cloned and sequenced the bison homologue of the cattle NRAMP1 gene. It appears that the same region of the NRAMP1 gene in cattle and bison seems to partially control natural resistance to brucellosis in both species. At present, researchers have approval to conduct a study to determine the frequencies of the NRAMP1 variants in Yellowstone and Grand Teton National Park bison herds. After this initial study, they should be able to determine if the NRAMP1 gene and others exist in these bison herds in a frequency which would allow for genetic based natural resistance to brucellosis as one of the components of disease control (Joe Templeton, Texas A&M Univ., pers. comm.).

Alternatives presented in the final environmental impact statement did not propose to selectively remove bison that developed brucellosis resistance under any of the alternatives, including the preferred. There currently is insufficient information to determine whether or not the removal of bison could remove genetic information, such as for brucellosis resistance. If the removal of bison that leave the park is not random, then it is possible that this practice may reduce the overall levels of genetic variation in the park herds (James Derr, Texas A&M Univ., pers. comm.). If bison are naturally resistant to brucellosis, then the nonrandom removal of bison could possibly risk the elimination of disease resistant genes (James Derr, Texas A&M Univ., GYIBC Executive Committee Meeting Minutes, May 21, 1998).

Representative Comment: 5635B

Issue 5: ***Risk if Bison and Cattle are Kept Separate***

A Comment: Cattle may occupy lands in the West Yellowstone area in the summer months, and bison in the winter. Does this (separation of time) not constitute separation? What is the risk when cattle and bison never cohabitate at the same time?

Response: Management actions to control brucellosis typically do keep cattle and bison separate in the west boundary area outside Yellowstone National Park (DEIS, p. 62). However, there are potential risks from *B. abortus* organisms that can remain viable in the environment for days outside the host after bison have left public land grazing areas. Discharges remain infectious for longer periods during cold weather. Direct sunlight quickly kills the organism. In studies conducted in conditions and habitats similar to those found in the Greater Yellowstone Area, researchers have found that in February and March, *B. abortus* organisms could survive about 17 days when exposed to sunlight and air and about 60 days when not exposed. The viability of the organism drops off rapidly during April and May as temperatures increase. By June, the bacteria could survive about 0.3 day with sunlight and air circulation and about 5 days without exposure (Cook 1999). For the modified preferred alternative, a 45-day separation of bison and cattle is used to ensure *B. abortus* bacteria would not be viable when cattle return. In addition, carnivores that feed on birthing or abortion products also play an important role in reducing the risks by removing potentially infectious material from cattle grazing areas.

Representative Comment: 9092I

B Comment: What are the chances that cattle would be exposed to contaminated bison birthing/abortion material?

Response: Given the temporal and spatial separation under all alternatives, the chances of exposure to birthing or abortion material, the most probable sources of *B. abortus* transmission, is negligible. If bison and cattle were not kept separate, then the probability of exposure to infected birthing or abortion material would be influenced by the abortion rate of bison, bison birthing behavior, the viability of *B. abortus* in the environment, and bison population size. Abortion of *B. abortus*-infected females is the most serious risk factor because most abortions occur in the winter during the third trimester of pregnancy. However, abortions among bison appear to be uncommon. This is because of the long exposure of bison to *B. arbortus*; they respond to it more like chronically infected cattle herds which frequently have built up some immunity due to frequent exposure to the organism at sub-infectious levels. In about 75 years, only four cases of abortion in the parks have been recorded. Regular surveillance has not been done; therefore, the actual number of abortions is greater. If abortions were common, many more reported cases would have been expected. In two cases, the abortion sites tested positive for *B. abortus* for at least two weeks (NAS 1998). In normal birth, the probability of transmission of *B. abortus* to cattle is a function of several risk factors described in the final environmental impact statement (see volume 1, "Purpose of and Need for Action: Background — Risk of Transmission") and the risk of transmission is likely lower than for an abortion event. Calving begins by mid-April, but most births occur during May and most bison are inside the park when giving birth, presenting no risk of transmission to cattle. There are always a few out-of-season births. Pregnant females separate from nonpregnant females to form nursery herds. Birth occurs in or close to the herd. The mother usually consumes the afterbirth. However, detailed observations of how

thoroughly the site is cleaned are not available. If consumption of afterbirth in bison is related to hormonal factors rather than predator avoidance, bison may not sanitize birth sites as thoroughly as elk, which do it to avoid predators (NAS 1998). Outside its host, the viability of *B. abortus* bacteria decreases rapidly during April, May, and June to as little as 5 days in a protected environment and 0.3 day when exposed to sunlight and air (Cook 1999). Scavenging by wildlife also reduces the occurrence of infectious tissues.

Representative Comment: 14875G

Issue 6: *Risk Associated with "Low Risk" Bison*

A Comment: What are the risks of infected bison bulls, calves, and yearlings transmitting brucellosis to livestock?

Response: Given the spatial separation that usually results from the management actions for brucellosis, the behavioral barriers to copulation between species, and the disease's debilitating effect on the males' breeding ability, the transmission of brucellosis between bison bulls and domestic cows in the Greater Yellowstone Area appears to be vanishingly small (NAS 1998). The risk of transmission from bison calves and yearlings is negligible.

Representative Comment: 14875G

Issue 7: *Education*

A Comment: Inform ranchers who graze cattle near the park about the small risk of brucellosis transmission and the potential consequences.

Response: Information and education of those involved or affected is an important aspect of any of the alternatives.

Representative Comment: 10319AD

B Comment: Inform other state veterinarians about risk management methods so they understand that the small risk of transmission is being managed and that there is no further reason to not allow cattle from Montana, Idaho, Wyoming.

Response: Education is important, as noted above. The modified preferred alternative includes the provision for APHIS to work with state veterinarians threatening sanctions or other actions against the state of Montana to ensure that they are completely educated and informed about the multitude of measures the bison management plan incorporates to eliminate the risk of transmission.

Representative Comment: 10319AD

Issue 8: *Risk Management vs. Elimination of Brucellosis*

A Comment: Risk management is the only ecologically sound alternative for the control or elimination of brucellosis.

Response: The agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of this management plan." While some alternatives presented in the *Draft Environmental Impact Statement* (alternatives 5 and 6) contain elements that more rapidly reduce seroprevalence in bison, they employ more lethal management actions that significantly reduce the bison population and may have adverse impacts on other wildlife species. All alternatives presented in the final environmental impact statement include risk management actions designed to reduce the risk of transmission of brucellosis from bison to domestic cattle. Most alternatives rely on both spatial and temporal separation of bison and cattle to reduce the risk of transmission, and some alternatives include other measures such as test and slaughter,

hunting, and bison population control to further reduce the risk of contact between bison and cattle. All alternatives include the vaccination of bison when a safe and effective vaccine is available. All of the actions included in the alternatives have the potential to affect other species, but only alternatives 5 and 6 are considered to have potentially major adverse environmental consequences through the placement and operation of numerous capture facilities within the Yellowstone National Park and through severe reduction of the bison population.

Representative Comment: 8949B

Land Acquisitions/Easements or Winter Range (BI-34)

Issue 1: ***Opposed to Land Acquisition/Easements***

A Comment: Commenters were opposed to the acquisition of private land by federal agencies because it is not a solution to the problem of brucellosis and only allows the bison population to increase to a new boundary where similar management actions must occur.

Response: The acquisition of private land and conservation easements near Yellowstone National Park by the federal government would improve flexibility for the future management of bison and other wildlife species. The basic problem of the disease of brucellosis would not be solved; however, land acquisition should reduce the conflict area, especially north of the park.

Representative Comment: 2029A, 9209E, 10406I, 14832B

B Comment: Some commenters do not want to see a de facto expansion of Yellowstone National Park.

Response: All acquired lands and conservation easements would be under the jurisdiction and management of the U.S. Forest Service and would be subject to the laws and regulations governing national forest system lands.

Representative Comment: 10406I

C Comment: Land acquisition will not solve the problem if land managers give priority to livestock on newly acquired lands (as they do on currently held agency lands).

Response: The existing national forest grazing allotments north of Yellowstone National Park will continue into the future, with management consistent with the primary wildlife objectives and "on-off" dates established to eliminate conflict with wintering bison. However, temporary grazing on the acquired Royal Teton Ranch lands may be allowed until a record of decision is signed selecting an alternative for bison management. If it is decided to have an SMA in the area west of the Yellowstone River north of the park, the management of these lands would likely be consistent with the overall plan for bison management. There is the potential for land acquisition west of the park, north of West Yellowstone near Duck Creek. The parcel being considered would be very unlikely to have livestock grazing as one of its uses due to the location and nature of the parcel.

Representative Comment: 10682I

D Comment: The Royal Teton Ranch land exchange (i.e., loss of the Mol Heron drainage) could be harmful to the grizzly bear.

Response: This issue is outside the scope of the current analysis. Although the fee-title purchase of the Royal Teton Ranch exchange for phases I and II is complete, the exchange is undergoing a NEPA analysis. Any impacts from this potential exchange on grizzly bears would be analyzed pursuant to the National Environmental Policy Act prior to a decision to go forward with the exchange. The U.S. Forest Service will also consult with the U.S. Fish and Wildlife Service under the Endangered Species Act regarding potential effects of the land exchange proposal on the grizzly bear and other threatened and endangered species. The current exchange proposal is balanced in terms of acres of grizzly bear habitat to be acquired and acres to be exchanged in the recovery zone. Also, as a condition of the exchange, the U.S. Forest Service will impose deed restrictions or similar binding protection measures on national forest section 16 in Mol Heron Creek to provide long-term protection for Yellowstone cutthroat trout and grizzly bear habitat.

Representative Comment: 15545N

E Comment: Private land acquisition by the federal government will harm the livestock industry.

Response: The acquisition of lands has been on a willing-seller basis, and the decision to sell is an individual decision on the part of the landowner. The amount of cattle grazing in Montana may be reduced if individual landowners chose to sell their land to the federal government and it was determined that management of those lands should emphasize resources other than livestock. Owners could also sell their land to a private landowner not wishing to raise livestock. The livestock industry would be negligibly affected by any private land acquisitions. The number of cow-calf pairs grazed on public and private land within the most extensive of the SMA alternatives total about 2,000 pairs. This is less than 0.2% of Montana's 1,532,000 head of beef cows and heifers that had calved as of January 1, 1999.

Representative Comment: 17856E

Issue 2: ***In Favor of Land Acquisition or Easement***

A Comment: Can we allow bison to roam near Yellowstone (create SMAs, buffer zones, safe zones, or protected areas) by acquiring additional private lands into federal ownership or getting them under conservation easements? Comments were specific and favorable to acquiring the Royal Teton Ranch properties.

Response: The U.S. Forest Service currently allows bison to roam on Gallatin National Forest lands adjacent to Yellowstone National Park. Other agencies that manage livestock disease have defined locations and times at which bison are not allowed to be in Montana on the national forest or private land. Land acquisitions and easements have been and are being pursued that would have the primary purpose of benefiting wildlife on their winter ranges. The following definitions will help explain some items in this response.

Land Purchase — Private lands are purchased by the U.S. Forest Service from willing landowners at appraised value, using Land and Water Conservation Funds appropriated by Congress for this purpose. Lands purchased in fee title become public lands, managed by the U.S. Forest Service as part of the national forest system.

Conservation Easement — A conservation easement is a permanent grant of certain property rights by a private landowner to the U.S. Forest Service, other agencies, or to a qualified conservation organization. Conservation easements are designed to permanently protect existing values, including scenic, open space, wildlife habitat, and/or agricultural values, by restricting other land uses such as commercial or residential development. Lands placed under conservation easement remain private lands and generally are not open to public recreational use. Conservation easements may be purchased at appraised value, or may be donated by the landowner.

Land Exchange — Private lands acquired by the U.S. Forest Service in exchange for national forest lands of approximately equal appraised value. Land exchanges are typically developed to improve public/private landownership patterns, protect wildlife habitat, and improve recreational opportunities. Land exchanges are subject to public comment and environmental analysis under the National Environmental Policy Act, the Endangered Species Act, and other federal laws and regulations.

In phase I of the Royal Teton Ranch purchase (completed in February 1999), the Rocky Mountain Elk Foundation acquired approximately 2,467 acres from the landowner, the Church Universal and Triumphant. The U.S. Forest Service then purchased these lands from the Rocky Mountain Elk Foundation. The phase I lands include the Bassett Creek inholding in the Absaroka — Beartooth Wilderness (151 acres) and 2,316 acres of Royal Teton Ranch lands west of the Yellowstone River between Yankee Jim Canyon and Cinnabar Mountain. In phase II of the Royal Teton Ranch purchase, completed in August 1999, the U.S. Forest Service acquired another 2,156 acres of Royal Teton Ranch land. The phase II lands are west of the Yellowstone River adjacent to the park boundary (near Cinnabar Mountain) and at Cutler Meadows. An additional 1,508 acres of winter range habitat were permanently

protected by purchasing a conservation easement in the Devil's Slide area. The phase II acquisitions were again facilitated by the Rocky Mountain Elk Foundation.

A proposed land-for-land exchange between the Church Universal and Triumphant and the U.S. Forest Service, currently being evaluated under the NEPA process, would result in public acquisition of an additional 1,002 acres of Royal Teton Ranch lands in exchange for 998 acres of national forest lands. Most of the Forest Service and Royal Teton Ranch exchange lands are located in the Mol Heron Creek drainage, outside of the primary winter range corridor. The acquired lands and the conservation easement will increase the amount of acreage of winter range available to bison outside the park. Further efforts are being made to acquire lands from willing sellers. Under alternatives 2, 3, and 7, these lands may become SMAs (DEIS, p. viii). Under alternatives 3 and 7 bison may be hunted in certain areas outside of the park (DEIS, table 10). Hunting of big game animals in the state of Montana is under the jurisdiction of the state and would need approval of the legislature.

Representative Comment: 11A, 632B, Form 1, 89C, 354B, 512C, 1135D, 8647B

B Comment: A variety of methods for land acquisition or easements were suggested, including working with groups like The Nature Conservancy or Rocky Mountain Elk Foundation, attaining the land from willing sellers, getting the land through eminent domain, seeking donations to pay for the land, etc.

Response: Funding for the Royal Teton Ranch land acquisition was received through the Federal Land and Water Conservation Fund, which was authorized by the Congress in 1998 and 1999. The land purchases and conservation easement acquisitions are being facilitated by the Rocky Mountain Elk Foundation. The Rocky Mountain Elk Foundation contributes substantial staff time and private funding to the project. Other conservation partners and agencies, including the state of Montana, are encouraged to assist in this ongoing effort. Other willing sellers have, and will continue to be, contacted by the U.S. Forest Service and/or the Rocky Mountain Elk Foundation. This effort has been ongoing since the Northern Yellowstone Elk Project began in 1988. Eminent domain (condemnation) is not being used because the federal government prefers to acquire private lands from willing sellers.

Representative Comment: 125B, 8867B, 14209Y

Issue 3: ***Other Land Acquisition Comments***

A Comment: Why is the language regarding private land acquisition or easement so vague in the *Draft Environmental Impact Statement*?

Response: At the time the *Draft Environmental Impact Statement* was written, options for acquiring land or gaining easements were in the early stages regarding who might be a willing seller and what land might be available. Since that time, significant progress has been made. The agencies and conservation partners are having considerable success by working directly with the landowners. If the names of landowners or specific land parcels appeared in an environmental impact statement prior to negotiations with potential willing sellers, this could adversely affect the negotiation process.

Representative Comment: 308G

B Comment: Acquired lands should not be used for a quarantine facility.

Response: The decision regarding siting of a quarantine facility would be made at a later time, through a separate environmental analysis process. All options are open until that time.

Representative Comment: 512C

C Comment: At most, only 8.5% of federal land surrounding Yellowstone National Park is available for bison winter range, and this is an insult to the concept of winter range.

Response: Taking topography and winter snow depths into account, the areas delineated on the maps in the *Draft Environmental Impact Statement* that are dotted are the only areas into which bison can travel in the winter and find forage. Snow depths elsewhere make travel impossible and/or cover and forage unavailable to the extent that it cannot be used for grazing. Bison rarely travel in steep topography and in the winter do not do this at all. In most northern states, wildlife populations are limited by the lack of forage accessibility in the winter due to snow and topography. The Yellowstone area is no exception. Bison could spend the winter on 100% of the national forest, but it is a physical impossibility for them to do so.

Representative Comment: 14700P

D Comment: The *Draft Environmental Impact Statement* needs to disclose how many acres of the SMAs are suitable for bison grazing and that bison should be allowed to roam on these public lands adjacent to Yellowstone National Park up to the carrying capacity of these lands.

Response: There are many ways to make inferences or estimate carrying capacity. While research to better define ecological carrying capacity of the park is ongoing, the agencies have presented two different approaches to estimate the number of bison that certain lands outside the park identified as SMAs might support. One approach, used in stochastic modelling for alternative 2, is to assume a bison eats the same amount of forage as a cow. Since approximately 2,000 cattle now graze at least part of the year in the lands north and west of Yellowstone National Park, a similar number of bison are assumed to be able to graze in these areas.

Another approach is to estimate pounds of forage available and, using an average amount of forage consumed by bison and other wildlife and accounting for agricultural use ("haying") of some lands, divide the total forage available by the average consumed. This latter approach is explained in detail below.

Three areas were assessed for carrying capacity. It was decided to delineate the areas actually known to be used by bison in the winter, i.e., either used consistently in winter by bison or used occasionally in years when weather and high population numbers combine to push bison out of the park. These areas largely coincide with the dotted areas on the maps in the *Draft Environmental Impact Statement* (see the Alternative 2 map on p. 69 of the DEIS, for example), except for the area near Hebgen Lake, where bison are known to pass through but not to spend significant time due to lack of forage being available above the snow level. Private land was not excluded from the acreage potentially providing forage to bison in the winter. This is because few private lands actually prevent bison from physical entry in the winter (although bison will be removed at a landowner's request). In addition, much of the Royal Teton Ranch land in the Reese Creek SMA has recently entered federal ownership; only a small part of the Eagle Creek SMA where bison actually winter is privately owned; and the major private acreage in the Horse Butte SMA was primarily in the Duck Creek area that does not exclude bison.

For these three areas, a vegetative layer was used to calculate acres of different habitat types used by bison in the winter. Range professionals used their experience and standard methods (reference to FSH2209.21) to estimate production of forage per acre for these habitat types. This included all available forage, grass, forbs, and shrubs. Food preferences or habits of different species were not taken into consideration for this analysis as it would tend to make the analysis unduly complicated and add additional estimates to values already being estimated. Snow depth was taken into account by the fact most of the acreage considered to be bison winter use areas either receive little snow (Reese Creek SMA) or have southern or western aspects where snow melts off (some parts of Eagle Creek and Horse Butte SMAs). The known topographically flat area of deep snow near West Yellowstone was excluded from acreage counted, and only 50% of the total forage was considered available. This leaves 50% to protect soil and watershed values and to be available to small mammals and birds. In addition, two of the areas included hay meadows that are highly productive but are usually harvested, it was estimated only 20% of the production was available to animals after harvest (and 50% of this would need to be retained for soil and water protection). There are also some areas within the delineated bison-use areas that may be unsuitable for grazing, such as rocky, steep, or marshy sites that could not be delineated due to their small

acreage. A conservative estimate of use at 50% for the year should adequately cover these nonforage areas. It should be noted that wildlife species do not usually overgraze habitat because they will migrate or move elsewhere before forage becomes difficult to obtain.

The three areas analyzed were Eagle Creek, north of Yellowstone National Park on the east side of the Yellowstone River; Reese Creek, also north of Yellowstone National Park but on the west side of the Yellowstone River; and the Horse Butte area west of Yellowstone National Park near Hebgen Lake. The portion of the Eagle Creek area that can be used by bison in the winter contains 8,355 acres and produce approximately 8.0 million pounds of dry weight forage annually. Using the same methods, the Reese Creek area includes 4,673 acres and produces approximately 5.8 million pounds of dry weight forage annually. The Horse Butte area is comprised of 4,227 acres and produces approximately 2.5 million pounds of dry weight forage annually. Subtracting the amount of forage that is hayed and then taking 50% of what is left as available for use by large herbivores, what remains is the pounds of forage that can be used by animals without damaging the soil and watershed and retaining cover and forage for small species of wildlife. This yields 3.6, 1.8, and 1.3 million pounds. of dry weight forage for Eagle Creek, Reese Creek, and Horse Butte, respectively (see table 1).

TABLE 1: POUNDS OF FORAGE AVAILABLE AND CAPACITY BY SPECIES IN THE THREE AREAS USED BY BISON OUTSIDE YELLOWSTONE NATIONAL PARK

	Eagle Creek	Reese Creek	Horse Butte
Acres	8,355	4,673	4,227
Lbs. forage available	3.6 million	1.8 million	1.3 million
Number of bison for 1 year (based on a 1,200 lb. animal) OR	321	162	112
Number of elk for 1 year (based on a 500 lb. animal) OR	767	385	267
Number of deer for 1 year (based on a 190 lb. animal) OR	1994	1001	695
Number of pronghorn for 1 year (based on a 120 lb. animal)* OR	n/a	1669	n/a
Number of moose for 1 year (based on a 700 lb. animal)**	535	n/a	193

NOTE: The numbers provided in the table are for one species only and must be adjusted downward as multiple species are present at different times of year.

*There are 100–200 pronghorn in this population.

** Moose numbers are likely to be in the teens at the highest in these areas.

In calculating carrying capacity, the estimated pounds of dry weight forage that different animal species consume on a daily basis must be considered to yield the amount of time an individual of a particular species could use that area. For this exercise, the following forage utilization numbers were used: bison 31 lbs forage/day, moose 18 lbs/day, deer 5 lbs/day, pronghorn 3 lbs/day, and elk 13 lbs/day (U.S. Forest Service, *Range Analysis Handbook*, p. 432).

Taking the total pounds of dry weight forage available and dividing by pounds of forage per day eaten by an animal of a certain species and then divided by 365 days, results in the number of animals that can be placed in an area for a year. For example, if approximately 3.6 million pounds of dry weight forage is

available to ungulates in the Eagle Creek area, and that number is divided by 31 lbs/day eaten by bison, it results in 116,129 days of forage available to bison. If this is divided by 365 days, it results in a carrying capacity of approximately 321 bison. Thus, the Eagle Creek area that bison use in the winter can support 321 bison for one year. Other factors include the fact that multiple species inhabit this area at different times of the year. There will be more than one species of herbivore present in an area at any one time. Cattle are present in the Horse Butte area during the summer in part of the area that bison use in the winter. The simplest of the three areas may be Horse Butte, which has bison and a few moose in the winter and cattle, primarily elk, and a few moose in the summer. The Reese Creek area hosts bison, elk, pronghorn, mule deer, and white-tailed deer in the winter, and in the summer pronghorn and deer. The Eagle Creek area hosts many elk, bison, and a few moose in the winter, and elk, a few bison, mule deer, and moose in the summer.

Therefore, calculating carrying capacity becomes an exercise in how many individuals of each species will be present in the area and for how long. For example, the Eagle Creek area has enough forage to host 321 bison for a year. However, it will also have elk present in the summer and winter. This same area has enough forage for 767 elk for a year. What normally happens is that some elk are here year-round, and a large number of elk exit the park in the winter and either stay in this area or move farther north through the Eagle Creek area. The Eagle Creek area may have hundreds of elk in it for most months of the year. In the winter, the bison tend to exit the park after the elk and enter the Eagle Creek area. This means that the elk have had first access to the available forage in Eagle Creek, but given the forage availability of the area, this should not be a problem unless both bison and elk numbers are very high and the winter is severe.

The Reese Creek area has enough forage available for 162 bison, 385 elk, 1,001 deer, or 1,669 pronghorn for a year. In reality, this area will have some combination of all of these species for portions of a year. The Reese Creek area only holds bison at most for about six months, which means that the capacity for bison alone would be 364 bison for the six-month period. This area also hosts other species at the same time, but only pronghorn and a few white-tailed deer appear to use this land year-round effectively saving most of the forage produced in this area for that six-month period. The number of bison removed at the northern side of the park has varied from 0 to 726 over the last 14 years. The average has been 144 bison per year. These numbers are somewhat confounded by including some removals east of the Yellowstone River as well as the Reese Creek area, but they indicate that in an average year 144 bison exit the park on the north side, and something less than this number could be expected to use the Reese Creek SMA on an average basis in the winter.

The Horse Butte area has enough forage available for 112 bison, 267 elk, 695 deer, or 193 moose for one year. In reality, there will be some combination of these species present at different times of the year as well as cattle on part of this area in the summer. Bison are not present year-round, but may be present for about five months of the year. The cattle allotment on Horse Butte overlaps part of this area for which forage was calculated. Cattle numbers allowed are 142 cow-calf pairs from June 15 to September 15 and 5 additional cow-calf pairs from June 1 to October 15. Each pair is considered to weigh 1,000 pounds and would consume 31 pounds of forage per day each for 91 days. This equates to approximately 417,000 pounds of forage. Approximately one-half of the allotment lies within the area bison use in the winter and this represents roughly 1/10th to 1/8th of the acreage that bison use in the winter in the Horse Butte area. That would mean that approximately 200,000 pounds of the available forage in the Horse Butte bison wintering area (or about 15%) is used by cattle prior to the bison arriving.

These areas, at present, do not come close to having the available forage consumed by any combination of wildlife species and livestock that are utilizing the area. The number of bison allowed in some alternatives on all three SMAs (a total of 400) appears to be well within the existing forage of these areas and is a fairly conservative estimate of the number of bison that these areas could support along with other ungulate species. The use rate of 50% is somewhat conservative and could be exceeded in some, but not all, years without causing resource damage. Even in years of relatively high bison and elk numbers, these areas outside the park have not been used to capacity, since some animals do not leave the park even in severe winters, and elk often move farther north on the north side of the park. Because there is great

variation in elk numbers and the numbers of other ungulates from year to year, an absolute carrying capacity for one species cannot be set with any degree of certainty.

Representative Comment: 14700P, 11A, 1081A, 14309I

F Comment: Bison should be free to roam on public lands adjacent to Yellowstone National Park because most of the land adjacent to the park is the Gallatin National Forest and private land owners have a relatively minor stake in the Greater Yellowstone Area.

Response: Although most of the land adjacent to Yellowstone National Park is federal land, the amount of suitable bison habitat on public lands adjacent to the park is comparatively small. Calculations of the amount of acreage outside the park that bison actually use yielded a total of approximately 17,255 acres due to topography and winter snow depth. Bison can theoretically use any public lands outside the park they can access, but they typically pull back into the park in the summer, and when they leave the park in the winter in search of forage, they are limited to lower elevations, flatter terrain, southern aspects, and/or fairly low snow depths.

Representative Comment: 9092C

Vegetation/Vegetative Communities (BI-43)

Issue 1*: Impacts of Bison, Other Wildlife, and Cattle Grazing on Plant Communities*

A Comment: Yellowstone National Park and the areas immediately adjacent to the park are overgrazed. Commenters requested information on the long-term and cumulative effects of bison, elk, and cattle grazing on riparian and upland vegetation communities in these areas, particularly as a result of the natural regulation policy for bison and elk populations. Some commenters further stated that bison grazing is beneficial to native plant communities, while others stated that bison are damaging these communities.

Response: Natural regulation of native ungulates was initiated in 1968 in Yellowstone National Park based on the premise that ungulates would reach an equilibrium with their plant resources. Prior to the initiation of the natural regulation policy, native ungulates were artificially controlled by park staff. The resultant expansion of ungulate populations has caused many to believe that the park is overgrazed. The term "overgrazing" can be defined simply as an excess of herbivory that leads to degradation of plant and soil resources. Overgrazing should result in reduced plant cover, increased bare ground, reduced organic inputs to the soil, drier warmer soil, and increased sediment yield following snowmelt and rain runoff (Pengally 1963).

Singer et al. (1998) published an assessment of natural regulation in the park and found the following. There was no widespread evidence of overgrazing observed through 1993 in study sites with vegetation communities that comprised about 97% of the winter range. No evidence of increased exotics, increased sediment yield, warming or drying of the soil, changes in soil nutrients, or differences in aboveground standing-crop biomass of plants was found between grazed and ungrazed plots. Ungulate herbivory apparently stimulated aboveground production of grasses, enhanced nitrogen and macronutrients in grasses, increased nutrient cycling, and enhanced measures of fitness in six common plants. However, exposed soil surface was greater on grazed than ungrazed plots, apparently due to a 71% decline in dead and standing litter on grazed plots. Percent live-plant basal cover, however, did not differ on grazed and ungrazed plots, and there was no difference in soil microclimate or sediment yield. Willow and aspen declines predated the natural regulation policy, but their slow declines continued after 1968. Some evidence of overuse was found in aspen and Wyoming big sagebrush stands. Overall the study concluded that there was little evidence to support the contention of overgrazing in upland shrub and grassland communities of the park and that the observed declines in aspen and willow could be associated with climatic changes, fewer fires, and lowered water tables due to declines in beaver populations, and could not be attributed solely to ungulate browsing (Singer et al. 1998).

Another symptom of overgrazing is smaller, thinner, and less healthy ungulates (Coughenour and Singer). This, however, has not been the case in Yellowstone. The 1998 NAS report states that bison killed outside the park in the winters of 1991–92 and 1996–97 were in excellent body condition with more than adequate body-fat stores. The report concluded, "Thus, there is little evidence of inadequate forage or quality available to Yellowstone National Park bison."

In the areas immediately adjacent to the park, specifically Eagle Creek/Bear Creek, Reese Creek, and the Horse Butte area, the U.S. Forest Service has determined that there are 17,225 acres of land available for use by large herbivores. These areas produce approximately 16.3 million pounds of dry weight forage annually. Subtracting the amount of forage that is hayed and then taking 50% of what is left as available for use by large herbivores, leaves the pounds of forage that can be used by animals without damaging the soil and watershed and retaining cover and forage for small species of wildlife. This leaves approximately 6.7 million pounds of dry weight forage available for large herbivores. These areas, at present, do not come close to having available forage consumed by any combination of wildlife species and livestock that are utilizing the area. The utilization rate of 50% is somewhat conservative, and could be exceeded in some, but not all, years without causing resource damage. Even in years of relatively high bison and elk

numbers, these areas outside the park have not been used to capacity since some animals do not leave the park even in severe winters, and elk often move farther north on the north side of the park.

Representative Comment: 15122D, 14904A, 10638R

Issue 2: *Noxious Weeds*

A Comment: Overgrazing by wildlife is resulting in the spread of noxious weeds.

Response: Current data do not support the contention that wildlife grazing has resulted in the spread of noxious weeds. An assessment of natural regulation in Yellowstone National Park found that there was no evidence of increased exotic vegetation in vegetation communities that comprise approximately 97% of the park's winter range (Singer et al. 1998). Resource managers responsible for monitoring and management of exotic weeds in the park have found that noxious weeds are more closely associated with road corridors, campgrounds, trails, and backcountry campsites than with wildlife foraging areas (C. McClure, pers. comm.).

Representative Comment: 11433D, 11121S, 9058G

Issue 3: *Carrying Capacity*

A Comment: What level of grazing can vegetation communities in the impacted area support? The carrying capacity of the impacted areas was not discussed sufficiently in the *Draft Environmental Impact Statement*.

Response: Although a specific ecological carrying capacity for bison in Yellowstone National Park has not yet been established, a population model developed by Boyce (1990) indicates that Yellowstone can support a long-term average of approximately 2,700 bison. Given natural variations in weather and forage production, combined with a small amount of predation, the bison population would be expected to fluctuate between 1,700 and 3,500 animals (see DEIS, p. 196). The stochastic bison population model used to analyze effects of alternatives in the final environmental impact statement did not explicitly account for the role of forage availability or quality because natural mortality rates, rates of bison migration from Yellowstone, and rates of exchange between wintering herds are all related primarily to winter severity. The *Management Policies* of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, undisturbed by humans to the maximum extent possible (NPS 1988). Currently, the National Academy of Sciences is conducting a review of available science related to the management of ungulates and their effect on rangeland within the park. A final consensus report of the National Academy of Sciences review is expected by October 2000 and will be presented to the Department of the Interior and Congress.

Representative Comment: 11160B

Issue 4: *Management*

A Comment: The National Park Service needs to apply grazing management principles or animal husbandry practices similar to those used by the U.S. Forest Service and the Bureau of Land Management and to control wildlife populations accordingly. The agencies should develop science-based management strategies to balance forage demand with forage availability.

Response: As noted in volume 1, "Purpose of and Need for Action: Objectives and Constraints," NPS policy calls for managing and protecting ecological processes and native species in a relatively undisturbed setting. Using grazing management or ranching and animal husbandry practices, all of which generally require intensive manipulation of animal herds, to manage a native species would be in conflict with this policy. Most population objectives set by range managers for domestic livestock grazing are based on "economic carrying capacity" (Caughley 1979), which manages for underuse of forage to

maximize production of, and hence economic gain from, livestock grazing on that forage. It is a "contrived equilibrium, held in place only by human intervention" (MacNab 1985). When livestock production for economic purposes or wildlife production for hunting offtake are not goals, however, as in a national park, managers may instead allow populations to fluctuate around "environmental" or ecological carrying capacity (MacNab 1985). This reflects the dynamics by which ungulate populations both impact and respond to the dynamics of the plants on which they feed. As noted in the *Draft Environmental Impact Statement* (pp. 21–22), recent studies in the park indicate that grassland habitats within the park exhibit high productivity and species diversity and do not appear to be adversely affected by ungulate population size. A recent study of the effects of the National Park Service's "natural regulation policy" evaluated the park's northern winter range according to several established criteria for range overuse (Singer et al. 1998). The study found that, according to four measures of range health, the northern range has not suffered degradation due to ungulate overuse. The National Academy of Sciences' National Research Council was mandated by Congress in 1998 to review "all available science related to the management of ungulates and the ecological effects of ungulates on the range land of Yellowstone National Park and to provide recommendations for implementation by the Service" (HR Report 105–163; appropriations in PL 105–83). The National Research Council consists of approximately 12 experts from various fields. Two of five public meetings of the National Research Council were held in the Greater Yellowstone Area on January 14 and 15 and July 9, 10, and 11, 1999. A status report was given to the Department of the Interior on October 1, 1999, describing the progress to date. A final consensus report is expected by October 2000 and will be provided to the U.S. Department of the Interior and Congress. According to the 1998 NAS report, bison removed during management actions in 1991–92 and in 1996–97 were in good-to-excellent body condition, indicating that even at a population size of more than 3,500 bison there is little or no evidence of inadequate forage quantity or quality. The location of a quarantine facility, should it be part of the selected alternative, would be unknown until a subsequent NEPA process is completed. This process would define variables such as design, size, and distribution of live bison completing quarantine as well as location. If ground disturbance or other construction-related impacts to cultural resources are anticipated, a site-specific inventory would be completed to determine appropriate mitigation. Below a population of 3,000, the magnitude of movements out of the park appears to be unrelated to winter severity and only very loosely related to population size. Research is underway to better understand the relationship between bison and habitat in the park and the relationships among bison population size, winter severity, and movements outside the park boundary. Results are anticipated in mid to late 2001.

Representative Comment: 11121Q, 14907A, 14876B, 1545C

B Comment: The agencies should seed bison grazing areas with late-season grasses to provide forage during crucial winter months.

Response: Seeding bison winter range areas with late-season grasses is unnecessary, as adequate forage resources are already present in these areas. Singer et al. (1998) published an assessment of natural regulation in Yellowstone National Park, and there was no widespread evidence of overgrazing observed in study sites with vegetation communities that comprised about 97% of the winter range. The 1998 National Resource Council report, *Brucellosis in the Greater Yellowstone Area* (NAS 1998), states that bison killed outside the park in the winters of 1991–92 and 1996–97 were in excellent body condition with more than adequate body-fat stores. The report concluded, "Thus, there is little evidence of inadequate forage or quality available to Yellowstone National Park bison." In the areas immediately adjacent to the park, specifically Eagle Creek/Bear Creek, Reese Creek, and the Horse Butte area, the U.S. Forest Service has determined that there are 17,225 acres of land available for use by large herbivores. These areas provide approximately 6.7 million lb. of dry weight forage available for large herbivores. These areas, at present, do not come close to having available forage consumed by any combination of wildlife species and livestock that are utilizing the area.

Representative Comment: 2082K

C Comment: If elk and bison overgraze the winter range a regulated harvest should be used to reduce population levels.

Response: As stated in several of the responses above, there is little scientific evidence that areas within and adjacent to Yellowstone National Park are overgrazed. However, the Montana Department of Fish, Wildlife, and Parks does use both regular and late-season hunts to accomplish population and habitat objectives for elk. Currently there is not a hunting season for bison in Montana; however, a regulated bison harvest, via hunting, has been included as a possible management action in several of the alternatives presented in the *Draft Environmental Impact Statement*.

Representative Comment: 14373ACC

Consultation

and coordination

New Alternatives/Issues (CC-4)

Issue 1: ***Coordinated Bison Management***

A Comment: Create an advisory team of wildlife professionals from the conservation community, Indian tribes, and federal agencies to review bison population issues annually.

Response: The National Park Service is evaluating bison population issues, including the carrying capacity of the park for bison and other large ungulates (see volume 1, appendix D for a description of ongoing research). The results of these and other studies are submitted for peer review before the National Park Service or other agencies act on it. Additionally, the federal agencies will continue to participate in the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) and will continue to work with the state of Montana to evaluate populations issues periodically. Finally, the National Park Service will continue to consult with tribes on bison management issues.

Representative Comment: 15420W

B Comment: Appoint a citizens' commission to develop a realistic, scientifically-based plan based on unbiased inventory of forage in the northern winter range to determine the number of elk and bison the park can handle.

Response: The agencies do not believe that a citizens' commission is necessary. The members of the interagency EIS team have developed realistic, scientifically-based management alternatives that are based on unbiased research. Although a specific ecological carrying capacity for bison in Yellowstone National Park has not yet been established, a population model developed by Boyce (1990) indicates that Yellowstone will support a long-term average of approximately 2,700 bison. Given natural variations in weather and forage production, combined with a small amount of predation, the bison population is expected to fluctuate between 1,700 and 3,500 animals (see DEIS, p. 196). All alternatives except alternative 7 allow the bison population to be maintained within this range largely through natural processes, although the population may be influenced periodically by management actions. Currently, several bison ecology studies and related research projects are underway, including a project that will synthesize all the available information and develop an ecological carrying capacity for bison in the Greater Yellowstone ecosystem. This work is expected to be completed late in 2001 or early 2002.

Representative Comment: 3032C

C Comment: Create an advisory team of agencies, tribes, and the public to annually review bison and other populations, while considering range conditions, climate, and other factors to determine bison management outside the park.

Response: The agencies have worked for many years on the resolution of the complex and often antagonistic issues surrounding bison management in and around Yellowstone National Park. During this time the agencies have considered input from the public, tribes, and various experts (including the National Academy of Sciences) and have participated in the GYIBC. Although the agencies welcome continued public comment and scrutiny, they believe subjecting ongoing bison management issues to a committee of experts in different fields would delay effective implementation of bison management.

Representative Comment: 9240G

D Comment: This process is so politically dominated that it needs an independent board of people with no political or economic motivation to make recommendations on how to proceed.

Response: The agencies acknowledge the political influences in this process. They believe, however, that the large amount of scientific information now available on the significant issues in bison management, as

well as knowledge learned from ongoing and future research, will form the basis for future bison management decisions.

Representative Comment: 14936F

Issue 2: ***Public Debate or Consensus***

A Comment: Arrange for public debate, including input from the scientific community.

Response: Although the issues of bison or elk management may benefit from a public debate, a public debate would contribute little to the EIS process. The GYIBC and/or the political process are perhaps more appropriate avenues.

Representative Comment: 3600D

B Comment: Set up a dispute board for conflict resolution without killing bison.

Response: Although it may be advantageous in some respects to have such a board, the management of bison often calls for immediate decision-making where guidance from a pre-existing plan is most helpful. If the agencies were required to wait for a conflict resolution process to take place each time a few bison threatened to leave SMA boundaries, were causing property damage, or refused to be hazed into a capture facility or back into the park, the objectives agreed to jointly by the agencies would be violated, and the agreements to cooperatively manage bison would be in danger.

Representative Comment: 3306C

C Comment: The EIS team should follow the Minnesota example and come to a consensus for all affected.

Response: At this time, the agencies are fulfilling the requirements of a court-ordered settlement to prepare a joint management plan. We believe coming to a consensus on a preferred alternative among agencies with divergent mandates is an excellent beginning; however, a consensus among all affected is outside the scope of this plan or environmental impact statement.

Representative Comment: 15223AA

Issue 3: ***Scoping the EIS***

A Comment: Adequate scoping of alternatives was never undertaken. This is apparent because the environmental impact statement has predetermined alternatives.

Response: A full range of alternatives is one that offers several reasonable choices to achieve a stated purpose of a project or plan. This planning process began with a set of guiding objectives or specific purpose statements to which each of the agencies could agree. If the alternatives do not achieve the purpose of the plan, there is no point in analyzing them, since this is the reason planning was undertaken in the first place. Scoping is a valuable means of broadening the range of alternatives or issues analyzed in an environmental impact statement; however, it is up to the agencies in charge of managing bison to determine which alternatives meet the objectives to a large enough degree to be considered reasonable, as well as being technically, economically, or legally viable. We believe the alternatives in the environmental impact statement are reasonable, do offer a full range of choices and are even extremely similar in many cases to those being suggested for analysis by the public during scoping.

Representative Comment: 14980C

B Comment: The "Citizens' Plan" was submitted to the agencies in 1991 and to the governor and GYIBC in 1997 and should have been included in the environmental impact statement in its entirety.

Response: The agencies analyzed components of the 1991 "Citizens' Plan" in various alternatives in the final environmental impact statement. Please see "Alternatives: Citizens' Plan" in this volume and table 13 in "The Alternatives" in volume 1.

Representative Comment: 15420F

C Comment: Scoping in 1990 occurred only in local communities adjacent to the park, yet this is an issue of national interest and significance.

Response: A history of scoping is available on p. 35 of the *Draft Environmental Impact Statement*. In addition to extensive EIS scoping (including several meetings, distribution of a comment summary to participants, and a second set of meetings to review alternatives), the issue of bison management has been before the public on a number of occasions in the form of National Environmental Policy Act (NEPA) or Montana Environmental Policy Act (MEPA) processes and documents on the *Interim Bison Management Plan*, prepared in 1990, 1992, 1995, 1996, and 1997. We believe this is adequate for any issue, including one of national interest.

Representative Comment: 14980C

D Comment: The objectives guiding the range of alternatives were never open to public debate and scrutiny through scoping, but were adopted in an interagency meeting.

Response: Yes, this is true. Courts have consistently upheld the agency's right to determine its goals and objectives in taking action. These are not normally open to public input, as they are derived from the mandates of the agency itself.

Representative Comment: 14980C

E Comment: The interim plan environmental assessment is incomplete, since it looks at one action alternative and so is predecisional.

Response: The adequacy of the environmental assessment for the *Interim Bison Management Plan* has been tested in court and found to be adequate. Any further discussion is outside the scope of this environmental impact statement.

Representative Comment: 14980C

Issue 4: *Draft EIS Review Period*

A Comment: It is exclusionary to have a 180-day comment period on the *Draft Environmental Impact Statement* after 8 years of developing it.

Response: The NEPA regulations governing all federal agencies and promulgated by the Council on Environmental Quality requires a 45-day public review of a draft environmental impact statement. The review period allotted by the agencies for the *Draft Environmental Impact Statement* was four times this length. We see no advantage to the public of increasing this already very long review period and no relationship between the amount of time it took to produce the impact statement and the time it should take to review it.

Representative Comment: 4490B

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (CC-31)

Issue 1: ***Government-to-Government Consultation***

A Comment: Proper consultation with the tribes did not occur. Although efforts were made by National Park Service representatives to present the *Draft Environmental Impact Statement* to the tribes, true consultation did not occur. In addition, other federal agencies did not participate in the meetings with the tribes. There is a trust obligation due and owing by all federal agencies to the tribes, and all agencies must strive to properly execute that obligation both individually and as one federal government.

Response: The National Park Service continues to meet with the many tribes that have expressed interest in the management of bison in and around Yellowstone National Park. The National Park Service plans to continue these meetings as it implements the final long-term bison management plan. The National Park Service does not consider the bison in Yellowstone National Park a trust resource to manage for one or more specific tribes. The National Park Service must manage the bison in Yellowstone, like the other natural resources in the park, for the benefit of all citizens of the United States. Prior to, and during the course of drafting and release of the *Draft Environmental Impact Statement* to the public, the agencies conducted government-to-government consultations with Native American tribes, as described in volume 1, appendix I of the final environmental impact statement.

Representative Comment: 14775H

Issue 2: ***Executive Order #13084***

A Comment: The Yankton Sioux Tribe Business and Claims Committee demands the U.S. government to immediately initiate official government consultations with the Yankton Sioux Tribe on this matter, as stipulated by Executive Order No. 13084, dated May 14, 1998, entitled "Consultation and Coordination with Indian Tribal Governments" and as mandated by NEPA stipulations that federally recognized tribes be given special consideration and that tribes are not to be considered as "the general public."

Response: As described in appendix I of the final environmental impact statement, the National Park Service has met with the tribes expressing an interest in the management of bison in and around Yellowstone National Park. The National Park Service plans to continue these meetings as it implements the final long-term bison management plan.

Representative Comment: 14701F

Issue 3: ***National Historic Preservation Act, U.S. Constitution, American Religious Freedom Act***

A Comment: Exclusion of tribal nations from this process is not only a violation of federal trust responsibility and President Clinton's commitment to consult and confer, it also violates the consultation requirements under the National Historic Preservation Act. (16 USC 470-1(3); 16 USC 470a(a)(1)(A); 36 CFR 800.1(c)(iii)(106); 16 USC 470a(d)(6)(A); 42 USC 1996); 6 CFR 60.4)

Response: The National Park Service recognizes that, although the bison in Yellowstone National Park are significant to many tribes, they are not a trust resource that would trigger a federal trust responsibility. The National Park Service also believes that the management of the bison herd, in and of itself, does not trigger compliance obligations under the National Historic Preservation Act. Additionally, the National Park Service continues to consult with tribes on bison management issues.

Representative Comment: 15368G

Cultural resources

Archeology/Cultural Landscapes/Ethnography (CR-31)

Issue 1: ***Visual or Scenic Impacts***

A Comment: The *Draft Environmental Impact Statement* fails to recognize the entire Yellowstone National Park and its surrounding public lands as a cultural resource.

Response: In the "Affected Environment" and "Environmental Consequences" parts of the environmental impact statement Yellowstone National Park, Gallatin National Forest, other public lands, and surrounding communities (essentially the Greater Yellowstone Area) are discussed from a variety of perspectives, including as a cultural resource. This discussion includes an examination of the prehistoric and historic record, archeological resources, historic structures, ethnographic resources, cultural landscapes, landscape and viewsheds, as well as visual resources and visual qualities within public lands. The park has the following projects underway or scheduled for the immediate future. An archeological inventory of the northern range of the park is scheduled to begin in 2001. A three-year parkwide inventory of the park's 1000+ structures is scheduled for completion in fiscal year 2000. A level 0 park reconnaissance survey is underway, and priorities for level one inventories in 1999 and 2000 are currently being identified. The park's ethnographic overview (Nabokov and Loendorf, 1999) is in final draft. Subsequent projects that have been identified include a traditional use study, an ethnographic resources inventory, an American Indian consultation plan, an ethnographic landscape survey, and the collection of ethnographic oral histories.

Representative Comment: 11416C

Issue 2: ***Traditional Cultural Property***

A Comment: Loss of open space and habitat has a direct effect on a healthy community — animal agriculture and the lifestyle it provides is a cultural asset. If ranching is lost or severely changed there is a resulting change in culture.

Response: The "Affected Environment: Socioeconomics" section in volume 1 discusses the social values, including the rural way of life experienced by some, as well as some aspects of the Native American experience. The modified preferred alternative discussed in the final environmental impact statement would have a minor impact on the traditional ranching lifestyle and a minor to major impact on tribes.

Representative Comment: 11121Y

B Comment: The environmental impact statement is flawed because it fails to recognize or coordinate with Native American tribes and their relationship with buffalo.

Response: There has been and continues to be a dialog between the National Park Service and various Native American tribes on numerous topics of mutual interest, including bison. The focus of the EIS process was to maintain a wild, free-ranging population of bison and to address the risk of brucellosis transmission. The EIS process sought to do this by considering a range of alternatives that would achieve this goal with minimal negative impacts. A focused evaluation was undertaken of both past practices and the context of the relationship between Native American peoples and bison. Through the comment process, a wealth of information has also been provided by various Native American individuals, tribes, and organizations, which added immeasurably to the final environmental impact statement. Appendix I, in volume 1 summarizes the input received from the tribes and tribal organizations regarding Yellowstone bison.

Yellowstone National Park continues to sponsor projects that will add to its knowledge base regarding cultural resources. In the park's draft ethnographic overviews, Nabokov and Loendorf examine tribes with aboriginal territory, including the Crow on the eastern side of the park proper, the Shoshonean people known as Sheep Eaters (believed to be the only Indians who were full-time residents of the highlands in

the park), and the Eastern or Wind River Shoshone for whom the bottom third of the plateau was apparently within their traditional territory. They suggest a possible Kiowa connection to the area (Nabokov and Loendorf 1999, pp. 61–62). Nabokov and Loendorf also attempt to organize information readily available concerning movements and possible cultural associations with the region for the Blackfeet, Flathead, Pend d'Oreille and Kootenai (Nabokov and Loendorf 1999, p. 113).

Subsequent projects that have been identified include a traditional use study, an ethnographic resources inventory, an American Indian consultation plan, an ethnographic landscape survey, and the collection of ethnographic oral histories.

Representative Comment: 469E, 2609A, 9105D, 6926G, 14609K, 14701A, 15354E, 15384B, 9369K

C Comment: The proposed quarantine facility being located on lands that belong to Royal Teton Ranch would significantly disturb wildlife, impair winter range, and harm American Indian cultural resources.

Response: The location of a quarantine facility, should it be part of the selected alternative, would be unknown until a subsequent NEPA process is completed. This process would define variables such as design, size, and distribution of live bison completing quarantine as well as location. If ground disturbance or other construction-related impacts to cultural resources are anticipated, a site-specific inventory would be completed to determine appropriate mitigation.

Representative Comment: 1610D

Issue 3: *Landscapes and Viewsheds*

A Comment: The entire Yellowstone National Park and surrounding public lands are a cultural resource. Visual and scenic values are an important component of the park and have cultural value.

Response: The "Affected Environment" and "Environmental Consequences" parts in volume 1 discuss Yellowstone National Park, Gallatin National Forest, other public lands, and surrounding communities (essentially the Greater Yellowstone Area) from a variety of perspectives, including as a cultural resource. This included an examination of the prehistoric and historic record, archeological resources, historic structures, ethnographic resources, cultural landscapes, landscape and viewsheds, as well as visual resources and visual qualities within public lands. In volume 1 "Affected Environment: Cultural Resources — Affected Cultural Resources," details about historic buildings and structures are discussed. None of the buildings or structures would be affected by the proposed action. The Yellowstone road system, which includes the Grand Loop Road and five entrance roads, would likewise be unaffected by the proposed action. Archeological and historic structure inventories were conducted in West Yellowstone and the area near Reese Creek, and no national register eligible or listed archeological resources or historic structures were located. In volume 1, "Environmental Consequences: Impacts on Cultural Resources," there is a brief discussion regarding steps taken to protect resources that are currently not uncovered or not identified. Site-specific surveys would be undertaken prior to any ground disturbance. In the event that previously undocumented resources were uncovered during construction, mitigation measures would be developed in consultation between all responsible parties.

Representative Comment: 11416C

Issue 4: *Religious Freedom*

A Comment: Also in the minority are our native peoples of America; the tribes, and their constitutional rights of religion should be respected when you're passing bills concerning their sacred companion, the buffalo. The sacred pipe is symbolic of the covenant. Under the American Indian Religious Freedom Act, all agencies must consider and evaluate the potential effects of any proposed action to those resources of cultural and religious importance to Indian people. While the *Draft Environmental Impact Statement*

presents some information on potential impacts to archeological sites, there is no discussion regarding the cultural impacts resulting from ongoing slaughter and proposed treatment of bison.

Response: Native Americans have a deeply held belief that bison are living cultural resources that form an integral part of their spiritual heritage, and that are vital to Indian culture, religion, and personal well-being. The modified preferred alternative is designed to preserve a viable, healthy population of free-roaming bison that does not exceed the carrying capacity of the park and the adjacent public lands, and manages the risk of disease transmission between Yellowstone bison and livestock grazing outside of the park. Implementing the modified preferred alternative would help to maintain an adequate range of herd size, allow herds to continue to use parts of their historic range, and minimize loss of genetic and ecological integrity — all of which would benefit tribal religious practices.

Management strategies in the modified preferred alternative also include movement of bison to Indian reservations or appropriate public lands. This would result in beneficial opportunities for some tribes to obtain bison traditionally used for religious and healing purposes.

Representative Comment: 6919D, 10676G, 14953A, 4D

Issue 5: ***Corrections/Revisions***

A Comment: In the discussion of cultural resources, the implication in the first several paragraphs is that bison were critical to indigenous peoples only in the past (although it is clear from other sections of the *Draft Environmental Impact Statement* that bison are still very important to Native peoples). Language should be changed so that the importance of bison to Native peoples is never presented in the past tense.

Response: Past-tense verbs regarding the importance of bison to Native peoples were removed in the final environmental impact statement.

Representative Comment: 90H

B Comment: Page xxv, paragraphs 1 and 2, "Summary Impacts on Cultural Resources." This section is written in the past tense. Native peoples continue to hunt today and hold bison as a critical element of indigenous culture within traditional homelands.

Response: This was revised to remove incorrect past-tense verbs.

Representative Comment: 9371E

C Comment: The text provided in the *Draft Environmental Impact Statement* is inadequate with regard to information on existing, ongoing, and planned cultural resource research, especially concerning Native American interests and history.

Response: The final environmental impact statement provides a more complete description of the ongoing and planned cultural resource research, in vol. 1, "Consultation and Coordination," and "Affected Environment: Cultural Resources." In addition, text revisions have been made to indicate that Native American cultural ties to bison are not a "past" event, but a very real part of tribal life today and critical to native peoples' future. Appendix I of volume 1 provides a summary of what the agencies learned during the government to government consultation process as well as the public comment period regarding the importance of bison to tribes.

Representative Comment: 9371F

D Comment: There is a great imbalance between the two brief paragraphs of tribal history versus the detailed and thematic treatment of nontribal history in the "Livestock and Agricultural Influences" history of the "Cultural Resources" section. This disparity reinforces the inappropriate treatment of bison as

livestock rather than wildlife and fails to fully develop the long cultural relationship between bison and tribal peoples. Furthermore, these brief history sections tend to reinforce the thinking that tribal history began when strangers and visitors arrived and that there is a separation between early peoples and native people today. This problem of separation of tribal past from the present perpetuates a predominant archeological myth and breaks a sense of continuity of history and culture. Understanding tribal past is critical to the understanding of tribal values and tribal ways of knowing aboriginal territory. We also recommend that tribal input be incorporated throughout the document rather than lumped together with general public input.

Response: See responses to comments 5A and 5C above, as well as volume 1, appendix I.

Representative Comment: 9371A

E Comment: When the interim management guidelines were developed, the National Park Service contracted with Virginia Ravandl to gather information regarding cultural ramifications of the bison in Yellowstone from the tribal perspective. The draft report Ms. Ravandl developed, which is referenced as being completed in 1997 on page 245 of the *Draft Environmental Impact Statement*, should be included in the appendices, especially since it was apparently never published.

Response: In 1995 the National Park Service contracted with Ms. Ravandl to produce a white paper on the cultural and social aspects of brucellosis and bison management. Her product underwent National Park Service peer review in 1999 and is in the process of being finalized.

Representative Comment: 11409AU

F Comment: Comments of the tribes regarding other alternatives have not been properly addressed in the *Draft Environmental Impact Statement*. Hunting is an additional management tool and would be available to help manage Yellowstone bison. Article IV of the Fort Bridger Treaty (July 1868) reserves the rights of the Shoshone and Bannocks to hunt on the occupied land of the United States. Since 1980 Shoshone and Bannock Tribes have had a hunting system in place that requires the use of big game hunting tags for off-reservation hunting. Tribal members have legally harvested bison in the Horse Butte area for several years. If hunting is used as an additional management tool, as stated in alternatives 3, 4, and 7, Shoshone-Bannock Tribe treaty rights regarding hunting should be honored, and tribal members should be allowed to participate in all bison hunts in the greater Yellowstone area.

Response: This comment involves the interpretation of treaties between a tribe or tribes and the federal government. Treaty rights present very complex issues, and the resolution of those issues is beyond the scope of this environmental impact statement. Regardless of treaty issues, however, the federal agencies will continue to consult with tribes on bison management issues.

Representative Comment: 14775F

G Comment: The discussion regarding impacts to cultural resources is very disappointing because it assumes the only impacts to cultural resources are to those archeological sites that may be affected by surface disturbing activities. It is not sufficient to characterize the impacts to cultural resources as limited to these archeological sites. Native American tribes of the region and member tribes of the InterTribal Bison Cooperative are culturally affected by the actions described in the *Draft Environmental Impact Statement* and yet no mention is made of the impacts to these cultures by the various alternatives. Examples of lost opportunities: if the record of decision does not include health certification and tribal relocation; if Montana continues to auction parts of slaughtered bison tribes will not be able to compete for the various culturally important parts of the bison used for medical purposes, ceremonial clothing etc. These lost opportunities should be evaluated and characterized, even if they cannot be quantified financially.

Response: The final environmental impact statement has been amended where needed to further address the impacts on tribes in volume 1, "Environmental Consequences: Impacts on Socioeconomics." The analysis acknowledges that impacts to tribes are potentially major.

Representative Comment: 14819AB

H Comment: Page 188 references that bison populations had already begun to decline by the 1820s. What is the geographic area referred to here, what is the literature source? Bison had already begun to decline in the eastern United States by that time, but there was no decline that early west of the 100th meridian. Please clarify the reference.

Response: The paragraph referenced in the comment has been replaced with the following:

The near extinction of the American bison did not occur in a short violent year. By the 1820s bison were confined almost exclusively to lands west of the Mississippi River. Many of these herds began to decline after 1830 as market hunting for hides accelerated. Prolonged drought in the 1840s further reduced bison numbers. After the Civil War, competition from domestic cattle and greatly intensified market hunting for "buffalo" robes and tongues decimated the Great Plains herds. Tourists on railroad shooting excursions killed thousands more. A final contributing factor was the introduction of cattle-borne contagious diseases, which reached epidemic proportions between 1881 and 1882. The combination of cattle, hunting, and epidemic disease all but eradicated the once immense western herds. By 1890 only about 300 bison remained in the United States (Malone et al. 1976).

Representative Comment: 14819BB

I Comment: On page 168 an amorphous reference regarding relocation of bison to InterTribal Bison Cooperative requires clarification. Bison relocated to an InterTribal Bison Cooperative member would not be ranched. Tribes manage their bison as wildlife and do not "ranch" their bison. InterTribal Bison Cooperative member tribes hold their bison in the public trust by the tribal government, they are not privately owned. Also a reference to "some tribes" who do not agree with the economic emphasis InterTribal Bison Cooperative places on their bison. If the agencies have specific information from a recognized tribal government regarding a different view of how tribal herds should be managed and specific criticism of the InterTribal Bison Cooperative approach, this specific information should be provided and referenced.

Response: This has been clarified in the final environmental impact statement.

Representative Comment: 14819W

J Comment: We believe it would be more appropriate to revise this section (cultural significance) to address each of the Tribal Nations individually and in greater detail. Certainly, attempting to cover all of the involved tribes and over 11,000 years of history in a mere paragraph is neither adequate nor acceptable.

Response: Yellowstone National Park continues to sponsor projects that will add to its knowledge base regarding cultural resources. An ethnography overview by Nabokov and Loendorf examines those tribes with aboriginal territory, including the Crow on the eastern side of the park proper, the Shoshonean people known as Sheep Eaters (believed to be the only Indians who were full-time residents of the highlands in the park), and the Eastern or Wind River Shoshone for whom the bottom third of the plateau was apparently within their traditional territory. They suggest a possible Kiowa connection to the area (Nabokov and Loendorf 1999; pp. 61–62). Nabokov and Loendorf also attempt to organize information readily available concerning movements and possible cultural associations, with the region for the Blackfeet, Flathead, Pend d'Oreille and Kootenai (Nabokov and Loendorf 1999, p. 113). In addition, the final environmental impact statement has been amended to include the input of tribes and tribal organizations who commented on the *Draft Environmental Impact Statement* and during the government-to-government consultations conducted to date. (See volume 1, appendix I.)

Representative Comment: 15363D

K Comment: I understand that an 1876 survey of the Yellowstone Park in Reese Creek was described as a drive there was, it was actually described as a stone drive where they driven animals for the hunt into the Reese Creek waters. I think has to be probably acknowledged that there were Indian people hunting here at least from the physical evidence.

Response: Consultation with Yellowstone National Park archivist Lee Whittlesey did not result in the location of any survey dated from 1876. However, it is known that in 1879 a government survey of the area was completed by R. Reeves. In 1878, the third Hayden survey examined the entire park. Both of these surveys refer to numerous "game drive ways" occurring throughout the park. As noted in the *Draft Environmental Impact Statement*, "Affected Environment: Cultural Resources," only approximately 2% of the park's archeological resources have been inventoried. Additional studies documenting park resources are either underway or are being scheduled for completion when funds are made available.

Representative Comment: 17714H

Human health

New Alternatives/Issues (HH-4)

Issue 1: ***Human Safety***

A Comment: The capture of bison in the rugged topography of Yellowstone National Park would pose a safety risk to those doing the work.

Response: It is true that attempting to haze and capture wild bison in rugged topography like that inside the park and wilderness areas surrounding the park would be dangerous. Bison are large and unpredictable wild animals that could turn and stampede horses or people on foot. Alternatives 5 and 6, which envision whole-herd roundups, have the greatest potential for safety risks and would require careful planning to minimize injuries. In contrast, alternatives such as the modified preferred alternative may pose fewer health risks to personnel because bison would not be captured, slaughtered, tested, loaded for shipment to slaughter, or vaccinated in-chute unless the early spring population was greater than 3,000 animals, more than 100 bison occupied the management zones outside the park, or bison could not be hazed back into the park in the spring before cattle return to graze. Alternative 2 would pose the fewest risks to humans compared to the other alternatives because agency personnel would not be implementing management actions associated with the capture, testing, and slaughtering of bison.

Representative Comment: 230H

Brucellosis Testing (HH-23)

Issue 1: ***Testing Cattle to Protect Human Health***

A Comment: Testing of cattle in high-risk areas of West Yellowstone seems important in terms of protecting human health.

Response: Cattle grazed during the summer in the West Yellowstone area originate from the brucellosis-free states of Idaho and Montana. Cattle from brucellosis-free states do not have brucellosis and pose no risk of transmitting brucellosis to humans. Nonetheless, Idaho does require testing of cattle that have been grazing in West Yellowstone before entering and leaving the state (see volume 1, "Environmental Consequences: Impacts on Livestock Operations" for more information).

Representative Comment: 5672D

Brucellosis Transmission and Public Perception (HH-24)

Issue 1: ***The Risk of Brucellosis is Understated***

A Comment: "Brucellosis is a serious zoonotic disease and a serious public health threat, and because of the potential to transmit to humans, brucellosis is one of the most regulated diseases of cattle." The *Draft Environmental Impact Statement* downplays brucellosis' importance as a zoonosis.

Response: With the advent of pasteurization of milk products and the reduction of brucellosis in domestic livestock such as cattle, domestic bison, and swine, human cases of brucellosis in the United States have been reduced from thousands in the 1940s to less than 100 each year in recent times. Historically, people at greatest risk are those who work with infected livestock, veterinarians, people working in slaughterhouses, and those who consume unpasteurized dairy products or improperly prepared organs (see volume 1, "Affected Environment: Human Health"). The *Draft Environmental Impact Statement* disclosed the risks of transmission as negligible-to-minor for those agency personnel handling tissues and samples from Yellowstone National Park bison. No health risks have been identified for the general public (see volume 1, "Environmental Consequences: Impacts on Human Health").

Representative Comment: 9364HH, 9243A

B Comment: Undulant fever is "with you for the rest of your life and recurs time and time again each year."

Response: There are treatments for brucellosis in humans. However, humans can have recurrent attacks of brucellosis despite extensive therapy with recommended antibiotics. The frequency of such attacks varies. Some patients appear to recover completely after treatment, but since *Brucella* are facultative intracellular bacteria, they are difficult to completely eliminate from the body.

Representative Comment: 15184A, 8802B

Issue 2: ***The Risk to Humans is Overstated***

A Comment: The risk of brucellosis transmission from bison to humans is overstated in the *Draft Environmental Impact Statement*. There have been no documented cases. "The available evidence suggests that, regardless of which alternative is evaluated, the risk of bacteria transmission to humans has to be negligible."

Response: The agencies are unaware of any documented cases of brucellosis in humans being attributed to Yellowstone National Park bison. Historically, people at greatest risk are those who work with infected livestock, veterinarians, people working in slaughterhouses, and those who consume unpasteurized dairy products or improperly prepared organs (see volume 1, "Affected Environment: Human Health"). The final environmental impact statement discloses the risks of transmission as negligible-to-minor for those agency personnel handling tissues and samples from Yellowstone bison. No health risks have been identified for the general public (see volume 1, "Environmental Consequences: Impacts on Human Health").

Representative Comment: 14714QQ

B Comment: A report states that brucellosis is no longer a serious health threat to humans. It is difficult to diagnose. But even in cases that are not treated with antibiotics immediately, there is usually a full recovery.

Response: The comment did not contain a reference for the report. However, full recovery cannot always be expected. Symptoms can usually be treated with antibiotics, but periodic recurrence of symptoms can also occur.

Representative Comment: 958A

C Comment: A report says that meat from an animal with brucellosis is not a threat to human health. Then what is the "flap" over brucellosis?

Response: Meat from brucellosis-affected animals is not a threat to human health. If improperly handled, other parts of an infected animal can be a source of infection, including its reproductive tract, vaginal discharges, aborted fetuses, newborn calves, and milk. Brucellosis in cattle can have serious health and economic consequences (see volume 1, "Purpose of and Need for Action: Background — Economic Impacts of Brucellosis in Cattle").

Representative Comment: 2082O

D Comment: "I have to wonder when there is so much attention being paid to brucellosis which no one seems to get anymore because of the pasteurization of milk, except perhaps a few veterinarians, why the government is not concerned with other animal diseases."

Response: The pasteurization of milk was an important factor in reducing the number of human cases of brucellosis. The main factor has been the virtual elimination of the disease from domestic livestock. Although the disease can cause suffering in humans, it causes the greatest financial loss due to abortions, sterility, decreased milk production, and weak calves in domestic livestock. The government is also involved in controlling and eradicating other livestock diseases and in preventing the entry of foreign animal diseases into this country.

Representative Comment: 14869F

Issue 3: ***Risk of Brucellosis Transmission to Park Visitors***

A Comment: There has never been a case of brucellosis transmission to a park visitor. The risk of transmission to people not in the vicinity of Yellowstone National Park is probably negligible.

Response: These comments are compatible with the analysis in the final environmental impact statement (see volume 1, "Environmental Consequences: Impacts on Human Health — Impacts Common to All Alternatives"). Based on information about the transmission of brucellosis from livestock to people, bison management would not be a health risk to the general public.

Representative Comment: 2719D

B Comment: The environmental impact statement needs to address the risk to people who travel through the bison's range, the direct risk from handling aborted fetuses, placentas, contaminated ground, or contaminated water, and the indirect risk from contamination that is spread by scavengers or from exposure to bison or elk should brucellosis spread from the containment area.

Response: (See volume 1, "Environmental Consequences: Impacts on Human Health — Impacts Common to All Alternatives.") Based on information about transmission of brucellosis from livestock to people, bison management would not be a health risk to the general public. Risks are greater for those people improperly handling aborted fetuses and placentas from brucellosis-infected animals, regardless of where such tissues are handled. The likelihood of a human accidentally coming in contact with contaminated birth tissues, dirt, vegetation, or aborted fetuses is remote. Experience in the field has shown that it can be extremely difficult to find bison birth sites and/or birth tissues even when the approximate location is known. Whether transmission would occur from contaminated water would depend on several factors, including the level of contamination and the dilution factor. Research shows that normal scavengers are dead-end hosts for brucellosis. Scavengers could potentially physically transport aborted fetuses and placentas from infected animals to other locations, but the risk of humans accidentally contacting tissues having viable *Brucella* bacteria is extremely remote (essentially zero).

Representative Comment: 7485A

Issue 4: ***Risk of Transmission from Meat***

A Comment: "Brucellosis free status for a state is extremely important for the sale of meat products by ranchers. It's proof that the product they sell is safe for human consumption." Undulant fever is a risk any time one handles meat from chicken to bear.

Response: Brucellosis primarily affects cattle (and elk and bison), swine, goats, and dogs. It may also affect sheep and occasionally horses as fistulous withers. Brucellosis is usually contracted through contact with infective material from the birthing process of affected animals or by consuming unpasteurized dairy products from infected animals. There is little, if any, risk from handling the meat of animals with brucellosis. A state's class-free status is primarily important as it relates to the economical production and interstate movement of domestic cattle. The sale of meat produced in a state would not be affected by its class-free status, because humans do not contract brucellosis by consuming the meat of affected animals, and there are no restrictions on the sale of such meat.

Representative Comment: 2376D, 9144F, 425M, 14261E

Issue 5: ***Risk of Transmission from Handling Carcasses***

A Comment: It would be irresponsible to allow public hunting of bison that could be infected with brucellosis because of the risk of contracting undulant fever.

Response: Bison are occasionally hunted in Wyoming, and brucellosis-affected elk throughout the greater Yellowstone area are hunted each year. This hunting may present a low risk to people. However, hunters who handle the carcasses and viscera of bison and elk can mitigate such risk using safe handling procedures. Some examples include using latex gloves and taking care not to open a gravid uterus. These precautions would minimize potential exposure to any *Brucella* bacteria that might be present. It should also be noted that no evidence exists of infection in Native Americans who have helped agencies to field dress bison carcasses shot as a result of the *Interim Bison Management Plan*, despite their "mucking through the guts" of hundreds of Yellowstone National Park bison (NAS 1998, p. 86).

Representative Comment: 940E

B Comment: "The two recent cases of Bang's disease that have been confirmed in Montana were traced to elk not bison."

Response: It is true that both patients had field dressed elk, and elk were suspected as the source of infection. More elk carcasses are handled than bison carcasses. While exposure of humans to bison is less than to elk, anyone else involved in handling carcasses of infected elk or bison could be at risk. Risks can be greatly minimized when taking precautions and employing safe handling procedures, such as not opening gravid uteri, wearing protective clothing such as gloves, and not rubbing ones eyes or mouth after handling reproductive organs or fetuses of animals.

Representative Comment: 9586F

C Comment: There is a case of a person who apparently got undulant fever from field dressing one of the bison during one of the bison hunts.

Response: The agencies are unaware of a case of a person contracting undulant fever from field dressing a bison. Although contracting undulant fever from bison or elk is likely remote, proper handling procedures, such as using gloves when field dressing or otherwise contacting potentially infected animals, their bodily discharges, or fetuses, would further reduce the already low risk.

Representative Comment: 15236B

D Comment: Why are Yellowstone National Park bison sent to slaughterhouses if there is a danger of brucellosis transmission to humans?

Response: Proper handling of the carcasses reduces the potential for the disease being transmitted during slaughter, and the meat of such animals has not been shown to transmit the disease through handling or by being consumed.

Representative Comment: 1243C

Issue 6: ***Donation of Live Bison to Native American Tribes***

A Comment: Until testing facilities are in place, why not donate live bison to tribes with stringent instructions on handling and preparation that must be given to hunters?

Response: At the present time, it is against existing regulations to transport live bison except to slaughtering or selected approved research facilities. The meat of bison shot or slaughtered outside Yellowstone National Park has been donated to Native American tribes. Alternatives 3, 4, 7, and the modified preferred alternative include a quarantine facility for the purpose of providing disease-free bison to tribes or other appropriate public lands (see "Bison: Distribution (Live)" in this volume for more information).

Representative Comment: 9144F

Issue 7: ***Strain 19 a Human Health Risk***

A Comment: Strain 19 should never be used to vaccinate Yellowstone bison because of the risk of strain 19 to human health. This subject is discussed in the National Academy of Sciences report.

Response: Lack of care in the use of strain 19, generally through needle sticks incurred by the vaccinator, can cause a risk to human health and can cause undulant fever. Safe and proper handling procedures can further reduce the risks to human health.

Representative Comment: 14819AA

Issue 8: ***Protection of Public Health and Milk Supply***

A Comment: The focus should be on the standards of other states and APHIS, standards whose purpose is to protect public health and our milk supply, and not on whether transmission has been proven between wildlife and cattle in the wild.

Response: Brucellosis is not a widespread public health threat. Because of the reduction of brucellosis in domestic livestock and the pasteurization of milk, the public health and milk supply are protected. Cases of brucellosis in humans are so rare that the Centers for Disease Control and Prevention does not list brucellosis as a reportable disease.

Representative Comment: 14884E

Issue 9: ***Centers for Disease Control***

A Comment: The Centers for Disease Control and Prevention would be unlikely to approve of circumstances that could reintroduce undulant fever to Americans. This was not analyzed in the *Draft Environmental Impact Statement*, but should have been.

Response: The bison management plan will not result in the reintroduction of undulant fever to Americans. Every alternative is designed to prevent transmission from bison to cattle. Bison and cattle are never in contact with each other under any alternative. The Centers for Disease Control and Prevention advise physicians on treatments for undulant fever, maintain records on cases reported in the United States (although the Centers for Disease Control and Prevention do not consider brucellosis a reportable disease) and when requested, provide advice on how exposure to brucellosis can be reduced in slaughter plants. The centers' expertise and authority are in the field of human diseases.

Representative Comment: 15316B

B Comment: The environmental impact statement should include information that the Centers for Disease Control and Prevention no longer requires reporting of undulant fever because of the small number of cases, the number of recent cases of undulant fever in Montana, Wyoming, and Idaho, and the source of those infections. The environmental impact statement should put the cases in the context of the thousands of hunters and hundreds of other people who have handled elk and bison carcasses. Montana had four confirmed cases from 1980–1995, Idaho reported 13 cases over the last 15 years, and Wyoming reported two cases since 1989.

Response: This is important new information. The reduction in undulant fever is largely a consequence of the success of the brucellosis eradication program in cattle. Please note that the environmental impact statement already indicates that the risk of transmission to hunters and slaughterhouse workers is quite low. In volume 1, the "Affected Environment: Human Health" and the "Environmental Consequences: Impacts on Human Health" sections describe the impacts on human health as generally negligible-to-minor based on the various management activities in each alternative. These sections also list measures to reduce risks of brucellosis transmission to humans.

Representative Comment: 15420ZI

Cultural Resources — Archeology/Cultural Landscapes/Ethnography (HH-31)

Issue 1: ***Bison as Traditional Diet***

A Comment: Health declines documented in Native Americans are related in part to dietary changes caused by depletion of fish and game resources and could be reversible by providing bison, fish, and game more often.

Response: The environmental impact statement acknowledges the importance of bison to Native Americans for a number of reasons, one being bison as a traditional food source for tribes. As articulated in the final environmental impact statement, in the event bison numbers are near established overall population levels, seronegative bison passing the quarantine protocol may be transferred to Indian reservations or other appropriate public lands. Bison carcasses will be available for donation in most alternatives, but the state of Montana holds the authority to determine how these carcasses are distributed from the slaughterhouse. See "Bison: Distribution (Carcasses)" in this volume.

Representative Comment: 14793A

B Comment: In addition to the citing of employment, per capita income, and poverty statistics, a supplemental environmental impact statement should be generated to address concerns with the Indian Health Service regarding the incidence of diabetes, heart problems, and other health problems among the tribes.

Response: The function of the Indian Health Service is not within the scope of this environmental impact statement, or a supplemental environmental impact statement . However, the document does acknowledge the importance of bison to tribes, and it analyzes the impacts of various alternatives on the availability of bison to Native Americans. There may be opportunities to transfer seronegative bison passing the quarantine protocol to Indian reservations or other appropriate public lands. Bison that are captured and shipped to slaughter are transferred to the authority of the Montana Department of Livestock. Those carcasses are available for the state of Montana to donate to Native American tribes, social services, and charitable organizations.

Representative Comment: 11409APP

livestock operations

Public Grazing Allotments — Modify (LO-28)

Issue 1: ***Cattle Allotment Removal or Modification***

A Comment: If disease is a problem, why not remove cattle (and allotments) from public land? Why not buy out existing livestock permits, etc.?

Response: Removing cattle from public allotments is possible if there is a habitat-related or resource issue (FSH 2209.13.16). The Montana Department of Livestock and APHIS are charged with managing livestock diseases, and the Forest Service cooperates with these agencies insofar as it involves national forest lands (36 CFR 222.8(a)(1) and FSM 2255.04b). A "Memorandum of Understanding" signed in 1995 by the Gallatin National Forest and the Montana Department of Livestock states further that "for all animals within the state of Montana, Department of Livestock is responsible under state law for the control of communicable and contagious diseases that affect livestock and diseases that are transmissible from animals to man." Neither the Montana Department of State Lands nor APHIS has indicated it is necessary to remove cattle (and allotments) from public lands. However, removing cattle or allotments from public land would not allow bison to roam freely outside of Yellowstone National Park due to the presence of cattle on private land near the park.

Representative Comment: 3595C, 15214B

B Comment: Why not reduce conflict by modifying grazing on public lands so that livestock and bison are unlikely to come into contact during critical times? One possible modification would be fencing.

Response: All alternatives include provisions for temporal and/or spatial separation to prevent contact during critical times, as noted by the commenter. Efforts have been and are being made to reduce the likelihood that livestock and bison come into contact during critical times. National forest livestock permits have been modified to allow for a change in the on date (allotment entry date) for cattle, to allow for a 30–60 day separation in time, if necessary, to minimize the risk of disease transmission in these areas. The 12 Gallatin National Forest allotment permits near Yellowstone National Park have been modified to include the following clause:

> This modification is hereby made a part of your grazing permit number _____, issued _____, by _____(Forest Supervisor or District Ranger as appropriate). It should be attached to your term grazing permit as pages 1 of 1, Grazing permit Part 3, Special Terms and Conditions. The following is hereby made a condition of your term grazing permit: The annual entry date for livestock to be placed on the grazing allotment authorized by this grazing permit, shall be no sooner than 30–60 days (exact number of days to be at the discretion and provided in writing by the state veterinarian) following bison leaving the grazing allotment.

Fencing, to keep bison either in or out of certain lands, has not been viewed as a viable option, because a fence that will stop bison will disrupt the passage of many other wildlife species (i.e., elk, antelope, deer, etc.) that currently pass freely through these lands.

Representative Comment: 198D, 265I, 870C, 14481D, 15214B, 15420QB

C Comment: Find alternate allotments for the ranchers with conflicts with bison.

Response: The idea of finding alternate federal allotments for ranchers in potential conflict areas was looked at early in the EIS process. No vacant allotments are available within an approximate 30-mile radius of the current 12 allotments near or in potential bison wintering areas. Officials in adjacent national forests were also consulted (Targhee and Beaverhead-Deerlodge). Finding alternate allotments would not alleviate concerns of bison leaving Yellowstone National Park and the potential risk for disease transmission to livestock due to the presence of livestock on adjacent private land.

Representative Comment: 4748A, 81D, 5123C

D Comment: Why not provide incentives to ranchers to modify their livestock operations to provide for winter foraging for bison? For example, have them switch to steer only or spayed heifer, bison, mature cows only, yearlings only, or raise bison, etc.

Response: Bison can and do forage on federal lands, and there is a wildlife forage allocation in these areas. Winter foraging is not a problem in the national forest, because there is sufficient forage, and cattle are not on the forest until June. The 30–60 day separation required by APHIS and the Montana Department of Livestock means that cattle cannot come onto federal allotments until bison have been off the range for 30–60 days; thus, from mid-April on is the period of concern for separation.

Some of the alternatives analyzed included providing incentives to ranchers to switch to nonbreeding cattle. The U.S. Forest Service is working with livestock permittees on Horse Butte now to switch to horses or yearling cattle.

Representative Comment: 2310D, 105B, 194C

E Comment: Bison management should not reduce cattle numbers on public lands.

Response: On national forest lands, cattle numbers are determined for allotments as a function of forage availability. The amount of forage has not been a limiting factor on these allotments; therefore, cattle numbers will not be reduced if bison use the allotments. Decisions made by the agencies that have the authority to manage disease (Montana Department of Livestock) could affect cattle numbers on the national forest land, but are more likely to affect the season of grazing ("Memorandum of Understanding," 1995, Gallatin National Forest and the Montana Department of Livestock).

Representative Comment: 17856E

F Comment: Why not pay ranchers for bison that show up on their land?

Response: Presumably this question means that ranchers should be paid not to graze cattle on their private land but to allow bison to use it instead. There is currently no federal or state compensation program to pay ranchers for allowing bison to use their private land. To date, ranchers have not requested such compensation or such an option. Unless all private landowners with livestock in the area agreed to such an effort, it would not resolve the bison/brucellosis issue.

Representative Comment: 5237A

G Comment: It is unacceptable to expect ranchers to switch from cow/calf to steer/spayed heifer operations. There are economic impacts of changing to steer or spayed heifer operations.

Response: The economic impacts of changing to nonbreeding operations was analyzed in the *Draft Environmental Impact Statement* and is more fully analyzed in this volume under the topic "Socioeconomics: Cost to Livestock Operators." It is true that fundamental changes in nearly all aspects of the operation, from marketing and risk management, to labor and management demands, to capital and noncapital expenses, would be required. Compensation for conversion would need to recognize these and intangible attributes of a cow-calf operation, as described in this section.

Representative Comment: 10406J, 15215I

H Comment: Modify cattle grazing practices to increase winter forage available for bison.

Response: There is no conflict for winter forage on public lands outside the park between livestock and bison or other wildlife; therefore, modifying livestock grazing practices to increase winter forage is not necessary.

Representative Comment: 836E

I Comment: Ranchers could provide "birthday pens" for cattle.

Response: It was assumed that the commenter meant to provide birthing pens or sheds for cattle. This does not address the transmission of brucellosis, which is primarily transmitted from bison calving and has essentially nothing to do with livestock calving.

Representative Comment: 4423G

J Comment: Slaughter cattle onsite or hold cattle in corrals during conflict times.

Response: It is uncertain which issue the commenter is addressing with the "slaughter cattle onsite" part of the question. Holding cattle in corrals during times of conflict with bison has the same effect as separating cattle and bison in time and space by not bringing the cattle into the allotment area until bison are gone or by hazing bison from the allotment prior to allowing cattle to come into the allotment. This is an option in most of the alternatives.

Representative Comment: 5455F

K Comment: Bison are not on federal land when cattle are.

Response: Bison and cattle can and have overlapped during the time they are present outside the park in the same areas, primarily in late spring and early summer. This overlap time has been in May and sometimes in June. Temporal separation of bison and cattle is necessary to ensure that no viable *Brucella* bacteria remain in the area when cattle are present. This is emphasized in the modified preferred alternative in the increase of tolerance of bison outside of the park under certain specified conditions.

Representative Comment: 1611B, 13477I, 14700E

L Comment: Ranchers should use fencing and dogs to reduce conflict between bison and cattle.

Response: Fencing was deemed an impractical solution due to the fact that it would completely block passage by all large ungulate species and perhaps other wildlife and would be very expensive. Because a key part of the bison and cattle issue is maintaining a temporal separation between their presence on the same piece of land, dogs would not be a practical solution for separating these two species in time.

Representative Comment: 2269C

M Comment: Let cattle use Bureau of Land Management and forest land adjacent to Yellowstone National Park. There are a number of references to letting bison use Bureau of Land Management lands outside the park.

Response: There are a number of references made to Bureau of Land Management lands. This appears to be a misunderstanding regarding the location and amount of Bureau of Land Management land in the analysis area. There is very little Bureau of Land Management land near the park and only a few sections in Paradise Valley north of the park, generally adjacent to the Gallatin National Forest boundary. None of the Bureau of Land Management lands lie within the largest area affected by the alternatives (alternative 2).

Representative Comment: 212B, 296E, 397B

N Comment: There is a substantial amount of government-owned land that is not being used for bison.

Response: This is true. Only a few bison, usually lone bulls, use the national forest in the summer in locations such as Slough Creek, Hellroaring Creek, and Eagle Creek north of the Yellowstone National Park. Bison typically move back into the park for the summer into an area that has the terrain and vegetation that bison appear to prefer. In the winter steep topography and winter snow depths severely restrict the areas bison can actually use on the national forest.

Representative Comment: 16449B

O Comment: Shoot the cattle.

Response: This is not a legal option.

Representative Comment: 3494A

P Comment: How many ranchers are using public land or private land adjacent to the park?

Response: Approximately 20 ranchers are using public land allotments near Yellowstone National Park, and approximately 14 ranchers are grazing livestock on their private land.

Representative Comment: 4817A

Q Comment: Acquire the private land owned by the Horse Butte rancher and move his grazing allotment.

Response: The subject of moving the Horse Butte allotment has been considered, but no suitable substitute has been found. The acquisition of private land is done on a willing-seller only basis, and this person is not interested in selling his land. In addition, there are other private landowners in the same area with livestock, so vacating the Horse Butte allotment and acquiring that person's private land does not entirely solve the conflict between livestock and bison.

Representative Comment: 10694C

R Comment: Do not take current public grazing areas to form SMAs.

Response: Two of the proposed SMAs (Horse Butte and Reese Creek) for several of the alternatives contain one or more U.S. Forest Service grazing allotments. The reason these areas were proposed as SMAs is that they are areas where bison can and do go in the winter. There are only a few areas outside Yellowstone National Park that are accessible to bison in the winter, and these are the lower elevation areas usually associated with a river corridor. Where allotments and SMAs overlap, some modifications in livestock operations may be needed so that bison and cattle are separated in time and space, as necessary, to prevent the risk of transmission of brucellosis. The modified preferred alternative emphasizes the use of management zones to further define the actions to be taken to separate bison and cattle under specific conditions.

Representative Comment: 14887G

Issue 2: *Legal Questions*

A Comment: Does changing federal livestock operations and permits require analysis of the National Environmental Policy Act, and is it legal or not (under current law)?

Response: The decision to authorize livestock grazing requires NEPA analysis and the disclosure of environmental effects. A change in livestock operations on an allotment (e.g., change in on-date) requires NEPA analysis only if there are significantly different environmental effects. U.S. Forest Service NEPA decisions are based on forage and habitat issues (FSH 2209.13.16).

Representative Comment: 9364N

B Comment: Grazing cattle on public land is a privilege and not a right.

Response: This is true.

Representative Comment: 182D, 1964A

C Comment: Why do bison seem to have lower priority on the Gallatin National Forest lands than cattle in areas where wildlife is supposed to have the highest priority? The Montana Department of Livestock should not make decisions that affect these public lands.

Response: The Montana Board of Livestock has no authority over the management of public lands adjacent to Yellowstone National Park. However, the Montana Legislature has, through statute, assigned specific responsibilities to the Board of Livestock and the Department of Livestock for the management of bison that emigrate from Yellowstone National Park into Montana, irrespective of the land on which those bison occur, for the purpose of disease control. The Montana Department of Livestock and APHIS have authority over livestock disease, and the U.S. Forest Service cooperates with these agencies insofar as national forest lands are involved (36 CFR 222.8(a)(1) and FSM 2255.04b).

Under the Gallatin National Forest Plan, the main goal in these areas near Yellowstone National Park is to provide habitat and forage for wildlife, and if there is forage available beyond what the wildlife need, then livestock can graze these areas. Most of the allotments where bison and livestock have potential for conflict are in management areas 13, 14, and 15, as presented in the Gallatin National Forest Plan, which lie within the grizzly bear recovery zone.

> Management area 13 (Gallatin National Forest Plan, pp. III-40–43) has a primary management goal for grizzly bear habitat and recovery. Little direction for grazing occurs in this management area because it is forested.
>
> Management area 14 (Gallatin National Forest Plan, pp. III-44–46) has a primary management goal for big game and a secondary management goal for grizzly bears. On allotments in management area 14, forage needs for big game are to be met before allocations of forage are made to livestock. Most of the lower elevation winter range north of the park consists of management area 14.
>
> Management area 15 (Gallatin National Forest Plan, pp. III-47–49) has a primary management goal for grizzly bears and a secondary management goal of providing forage for livestock consistent with recovery of the grizzly bear.

Other management areas allow other uses that do not conflict with the primary goal. Direction in the forest plan deals strictly with habitat or forage management. Cattle grazing has not been a conflict with this primary emphasis on allotments in management area 13, 14, or 15. There is no conflict between wildlife and cattle for habitat. Where there is conflict, it is related to disease, which is an issue under the authority of Montana Department of Livestock and APHIS.

No cattle currently use federal land on the east side of the Yellowstone River near Yellowstone National Park. The Eagle Creek area is a wildlife area which has no livestock allotments and is proposed as an SMA under a number of EIS alternatives.

Representative Comment: 95C, 4490D, 13321G, 7029A, 10475aE

D Comment: Public land grazing is not beyond the scope of the *Draft Environmental Impact Statement* and should be addressed in it. The *Draft Environmental Impact Statement* should analyze the impact of cattle grazing on bison and the grazing policies in the Greater Yellowstone Area.

Response: As described on p. 3 of the *Draft Environmental Impact Statement*, the focus of the *Draft Environmental Impact Statement* is to propose "several options for the interagency, long-term management of Yellowstone area bison to ensure domestic cattle in portions of Montana adjacent to Yellowstone National Park are protected from brucellosis, a disease that some of these bison carry, and to ensure the viability of the bison herd." The *Draft Environmental Impact Statement* also presents a number of alternatives (all but alternative 5) that allow for some modifications of grazing allotments on the Gallatin National Forest and three alternatives (2, 3, and 7) that allow for more significant modifications of livestock operations on the forest (DEIS, p. 37). The purpose of the EIS process is to analyze and disclose the effects of bison management on the various resources. The effects of cattle grazing on bison has been or will be addressed in each grazing permit decision on allotments where it is applicable. It is essential to note that the agencies have no control over private land activities, and even if all livestock were removed from public lands, there would be conflicts between bison and livestock outside the park on private land. Therefore, there is no merit in assessing public land grazing as an alternative that will meet the stated purpose for action, which is to maintain a wild and free-ranging bison herd while protecting the economic interest of the livestock industry of the state of Montana (DEIS, p. 11).

Representative Comment: 14714DD

E Comment: The *Draft Environmental Impact Statement* mischaracterizes the U.S. Forest Service's authority to manage livestock operations.

Response: The U.S. Forest Service has the authority to regulate grazing on national forest lands (FSH 2209.13 FSH and CRF 222.4). The U.S. Forest Service has no authority over livestock disease (36 CFR 222.8(a)(1) and FSM 2255.04b). The U.S. Forest Service has no authority to make determinations relating to disease transmission. Should agencies that have such authority indicate to the U.S. Forest Service that changes in grazing allotments are warranted, the U.S. Forest Service will cooperate to the fullest.

Representative Comment: 15420QB, 14714EE

F Comment: The *Draft Environmental Impact Statement* provides no assurance that bison will be allowed to range on public lands outside the park.

Response: The National Forest Management Act allows and encourages the use of national forests for wildlife. As far as the U.S. Forest Service is concerned, bison may use the national forest. Other agencies have decided that for disease reasons, bison cannot be allowed to roam freely on adjacent private lands.

Representative Comment: 2565C

G Comment: There was concern that the *Draft Environmental Impact Statement* only has modification of grazing under alternatives 2, 3, and 7.

Response: The *Draft Environmental Impact Statement* presents a range of alternatives. The three alternatives that include modification to public land grazing provide the deciding officials with enough information that they can assess the merits of this potential action. The agencies' deciding officials may choose any part of any alternative in their decision. This means that modification of grazing is allowed under any decision and not just limited to three of the alternatives. Alternatives are often not selected in their entirety, or are modified between the draft and the final environmental impact statement so that the "agency preferred alternative" often contains all of the pieces desired by the deciding officials. The record of decision for this environmental impact statement will have the pieces selected for the agency decision.

Representative Comment: 14980O

H Comment: Eliminating public land grazing would require an amendment to the National Gallatin Forest plan.

Response: A forest plan amendment and related NEPA analysis is one possible means of closing livestock allotments on Gallatin National Forest land. It could also take place through the allotment management planning process. Further NEPA compliance would be tiered to the final environmental impact statement. The current forest plan and its management area designations allow all actions that are proposed within this impact statement.

Representative Comment: 14816G

I Comment: Many individuals commented that cattle vaccination is cost-effective compared to other management actions.

Response: The modified preferred alternative includes vaccination of bison and cattle as primary management components. Under this alternative the costs of vaccination for both species will be borne by the federal government. The agencies agree that vaccination is a cost-effective method to reduce the risk of brucellosis transmission.

Representative Comment: 5887B, 8384D, 14202B, 15787G

J Comment: The need for action portrays the illusion that portions of the Gallatin National Forest have already been put aside for bison, but much of the Gallatin National Forest remains an area of multiple use.

Response: The U.S. Forest Service is a multiple use agency. As a multiple use agency, lands in the national forest system are rarely designated for a single use, but often have goals, objectives, and standards related to several activities or uses. Most of Gallatin National Forest near Yellowstone National Park is within management areas 13, 14, and 15, which are within the grizzly bear recovery zone. Management area 13 (Gallatin National Forest Plan, pp. III-40–43) has primary management goals for grizzly bear habitat and recovery. Little direction for grazing occurs in this management area because it is forested. Management area 14 (Gallatin National Forest Plan, pp. III-44–46) has a primary management goal for big game and a secondary management goal for grizzly bears. On allotments in management area 14, forage needs for big game are to be met before allocations of forage are made to livestock. Most of the lower elevation winter range north of the park consists of management area 14. Management area 15 (Gallatin National Forest Plan, pp. III-47–49) has a primary management goal for grizzly bear and a secondary management goal of providing forage for livestock consistent with recovery of the grizzly bear. Other management areas allow other uses that do not conflict with their primary goal. Direction in the forest plan deals strictly with habitat or forage management.

Representative Comment: 9364P

Issue 3: ***Other Questions on Livestock Grazing***

A Comment: Why are grazing fees so low (some commenters believed fees should be higher, some believed they should be lower)?

Response: Grazing fees are set by U.S. Congress, and the agencies do not have the discretion to charge higher or lower fees. Public land livestock grazing fees are not relevant to the development of bison management decisions.

Representative Comment: 88A, 10537G

B Comment: Livestock grazing damages public land.

Response: Impacts of livestock grazing on national forest resources are addressed with each grazing permit decision. Undesirable effects of grazing on the environment would be addressed by adjusting grazing management practices in the permit.

Representative Comment: 127B, 3947E

C Comment: Comments related to livestock grazing — leases and allotments on public lands.

1. What is the nature of the leases or allotments? How are they made or awarded? How are permits awarded?

Response: Grazing allotments were created on the national forests soon after the national forests were created in the early 1900s. The permit allowed livestock owners that had a private property base near the allotment to continue grazing their livestock on the area that had entered the national forest system. Since that time, allotments have been transferred either by sale of the base property or sale of the permitted livestock. A permit is always waived back to the U.S. Forest Service upon the sale of base property or permitted livestock. The U.S Forest Service then decides whether or not to reissue the permit and under what conditions. The person that purchased the base property or permitted livestock is given first consideration in the reissuance of the permit.

Allotments are fixed in space and have had the required acreage and forage production calculated for a given number of permitted livestock. New allotments are not being created, and a number of existing allotments on forest land are vacant.

2. What is the length of a permit?

Response: Livestock permits for an allotment undergo a NEPA analysis process every 10 years where the decision is made whether or not to graze domestic livestock.

The current allotments within the analysis area for this environmental impact statement are shown in table 2. Only a few of these allotments have real potential for bison to occupy them.

TABLE 2: CURRENT LIVESTOCK GRAZING PERMITS ON NATIONAL FORESTS

Allotment	Acreage	Year for NEPA Review
Slip & Slide	6,795	2000
Green Lake	3,558	2003, 2005 (2 permits)
Sentinel Butte	570	2001
Section 22	586	2005
Park	14,650	2001
Lion Creek	7,000	2003
Mill Creek	800	2005
Wapiti	7,979	2003
Watkins Creek	4,689	2005
Horse Butte	2,200	2001
South Fork	217	2005
Basin	26	2006
Sulphur Spring	233	2000

3. What power does the Department of Agriculture have to refuse to lease land in the public interest or to limit the risks of brucellosis?

Response: The U.S. Forest Service cooperates with agencies that have the responsibility and authority to manage livestock disease. These include APHIS and the Montana Department of Livestock. The U.S. Forest Service has amended its grazing permits near Yellowstone National Park so that spatial and temporal separation of cattle and bison will occur on forest service allotments. The state veterinarian decides when the cattle may enter the allotment.

4. How are leases or allotments terminated?

Response: They are terminated through a NEPA analysis and decision process.

Representative Comment: 14209s, 127B, 3947E

D Comment: More specific information is needed on the separation in time and space required for bison and cattle.

Response: One of the primary management components of the modified preferred alternative is the temporal and spatial separation of bison and domestic livestock. Bison are not allowed to intermingle with cattle and are hazed back into the park or captured. If they cannot be hazed approximately 45 days before cattle return to graze in the summer, they will be shot. This is to ensure all viable bacteria are destroyed by the heat and light of a typical Montana spring. For a detailed description of the viability of *Brucella* in the environment, please refer to volume 1, "Affected Environment: Bison Population — Viability of *Brucella Abortus* in the Environment."

Representative Comment: 14819II

E Comment: Ranchers should take the risk of brucellosis if they want to graze cattle near bison.

Response: Although ranchers in the analysis area currently vaccinate their cattle, they do take a risk. The Montana Department of Livestock defines levels of risk of brucellosis allowable in the state related to the class-free status and the sanctioning by other states of Montana's cattle. The impact of brucellosis transmission from bison may apply to more than just the rancher whose cattle are infected. There is risk to other cattle herds as well. Due to the potentially lengthy incubation period of brucellosis, a single test prior to shipment may not ensure that an animal is free of the disease. Transmission could occur undetected in the first cattle herd, then spread to other herds in other areas or states before being detected. There are also potential economic effects to the state livestock industry if the state's brucellosis status is downgraded in response to the occurrence of brucellosis in cattle.

Representative Comment: 4107B, 2273B, 14540D

Cattle — Brucellosis Class-Free Status (LO-25)

Issue 1: ***Other States' Actions***

A Comment: Other state animal health officials do not want to risk brucellosis being reintroduced into their states because of transmission from infected bison to cattle and subsequent importation of those cattle. Some are willing to impose "significant mitigating restrictions."

Response: Each alternative has been constructed to protect Montana livestock in the impact area from the threat of transmission of brucellosis by bison. Each ensures spatial and temporal separation of susceptible cattle from potentially infectious bison or environmental contamination. Many include additional measures to reduce risk even further.

The modified preferred alternative proposes several actions to further minimize the already low risk of transmission of brucellosis from bison to cattle and to maintain a wild, free-ranging bison population. It relies primarily, as do all other alternatives, on temporal and spatial separation, but it also requires the vaccination of any cattle that may use areas near the park in the summer that bison may use in winter (APHIS would reimburse producers for direct costs of vaccination), the vaccination of bison with a safe and effective vaccine, and increased monitoring and surveillance of cattle that may graze on lands near the park in summer. To help with the perceived risk and possible resulting threats of sanctions by other states, it also provides additional measures. Should another state threaten or impose sanctions on the state of Montana while implementing the modified preferred alternative, APHIS would work to convince any state threatening sanctions that sanctions are unwarranted and not scientifically supportable. APHIS would make funding available to certify individual cattle herds that graze in areas that bison may occupy in winter as brucellosis-free and APHIS would pay the direct costs of additional testing of any cattle that might, in a very unlikely event, commingle with bison.

Representative Comment: 9317B

B Comment: The final environmental impact statement must address "incentives for all state veterinarians and agricultural agencies to accept the fact that Montana's brucellosis-free status and its livestock are not at risk from buffalo in Greater Yellowstone Area."

Response: All alternatives maintain Montana's brucellosis class-free status and employ a variety of measures to address the risk of brucellosis transmission to protect the economic interest and viability of Montana's livestock industry. APHIS, the federal authority on animal health and the agency most involved in the brucellosis eradication program in the United Stated, has indicated any of these alternatives which are based on the temporal and spatial separation of cattle and bison would be sufficient to prevent the transmission of brucellosis to cattle from bison. See the response below under Issue 2B (USDA Authority and Actions Relative to Brucellosis Status) for a discussion of the conditions that must be met for a class-free state to retain its status.

Representative Comment: 11020C

C Comment: Other states do not have authority to impose sanctions on Montana due to the presence of bison from a brucellosis-infected herd. "It is inconsistent with the intent of the National Brucellosis Eradication Program. These sanctions are likely illegal under the interstate commerce clause of the U.S. Constitution." Montana or the federal government should challenge these sanctions in court.

Response: It has not been the policy in the past to pursue legal action against states for placing additional restrictions or requirements on the interstate movement of livestock. Instead other avenues have been pursued. The federal government has informed other states that the actions taken by Montana are sufficient to prevent the spread of brucellosis and that unless supported by accepted science, other restrictions would be unwarranted. In the modified preferred alternative, the perceived risk of state sanctions is addressed through the commitment of APHIS to consult with states threatening sanctions,

convince any state threatening sanctions against Montana (while carrying out the elements of the bison management plan) that sanctions are unwarranted.

Representative Comment: 5643K, 10475AE

Issue 2: ***USDA Authority and Actions Relative to Brucellosis Status***

A Comment: Comments questioned the authority of APHIS to remove Montana's brucellosis class-free status based on the presence of wild, free-ranging bison from Yellowstone National Park in Montana.

Response: The presence of bison from the park in the state of Montana will not cause Montana to be downgraded from a class-free state. The brucellosis eradication program, which confers state status, currently only applies to domestic cattle and bison, not wild, free-roaming bison. All alternatives provide measures for bison to be controlled so that they do not have contact with cattle in Montana, thus preventing possible transmission of brucellosis from bison to cattle. (See volume 1, "Appendix E: Legislation and Policy Guidance, National Park Service, U.S. Department of the Interior.")

Representative Comment: 14841A

B Comment: What are the APHIS requirements if cattle were diagnosed with brucellosis?

Response: According to the regulations pertaining to the maintenance of a brucellosis class-free status, a state would be allowed to maintain that status if one brucellosis infected cattle herd is disclosed in that state, provided they met certain criteria. Those criteria include quarantining, testing, depopulating the herd, the completion of a thorough epidemiologic investigation of the herd, and all resultant herd testing. This work must all be completed within 60 days of disclosure of the infected animal in the herd. If this is all completed, and a subsequent review verifies it, then the state can retain its class-free status. This provision can be applied no more than once in a two-year time frame. As long as the state met the requirements for brucellosis class-free status, they would maintain such status.

Representative Comment: 14819U, 14634M, 15420RB, 10638N

C Comment: APHIS authorities, policies, and practices related to wild bison should be clarified. Current or planned efforts by the agency to change these authorities, for example, through rule changes or resolution, should be described.

Response: At this time, APHIS has not indicated any changes in its regulations specific to wild bison. Also see the response to issue 2A above, and "Appendix E: Legislation and Policy Guidance, National Park Service, U.S. Department of the Interior" in volume 1.

Representative Comment: 15420RB

D Comment: The U.S. Department of Interior, of which the National Park Service is a part, has no legal authority over free-ranging bison and cannot downgrade Montana's brucellosis status due to the presence of "potentially exposed" bison in Montana.

Response: The U.S. Department of Interior is not involved in the designation of a state's brucellosis status. APHIS is responsible for the brucellosis eradication program, and the designation of state status is a part of that program. Please also see "Appendix E: Legislation and Policy Guidance, National Park Service, U.S. Department of the Interior" in volume 1.

Representative Comment: 2271A

Issue 3: ***Changing APHIS Regulations***

A Comment: APHIS should change its regulations so that the whole state of Montana does not lose its class-free status due to bison-cattle contact in only two counties.

Response: Montana will not lose its class-free status merely due to potential bison-cattle contact in two counties. Montana's class-free status would be reevaluated if such contact resulted in a cattle herd in Montana becoming affected with brucellosis. A state also has the ability to acquire "split status" as long as the state has (1) the legislative and regulatory authority for maintaining separate areas, (2) the state has committed resources to enforcing the different requirements in each area, (3) the state has an effective method for monitoring and controlling movement of cattle across the intrastate boundary, and (4) the state has defined the intrastate boundary by county lines or recognizable geographic features. Also please see above response (issue 2B) on actions that would be taken for a state to maintain its class-free status in the unlikely event a cattle herd became infected with brucellosis.

Representative Comment: 7554J

Issue 4: ***Apply Status to Portions of a State***

A Comment: If there is a brucellosis outbreak in Montana cattle, APHIS does not have to downgrade the status of the whole state. Under 9 CFR 78.40, it can subdivide the state for classification purposes. APHIS has effectively done so in Wyoming. APHIS should apply its brucellosis status on a county-by-county rather than state-by-state basis. Doing so would remove the economic risk from Montana counties where there is no possibility of contact between cattle and Yellowstone bison. "When APHIS reclassified Montana as a brucellosis-free state in the mid-1980s, it did so on a county-by-county basis rather than reclassifying the entire state at once."

Response: A state is allowed to have a split status. However, in order to do so, there must be strict border controls to control movement between the two areas and certain other provisions must be put into place. Split status is applied to areas within a state not on a county basis. Please see Issue 3 (Changing APHIS Regulations) above. In addition, the modified preferred alternative provides for funding and a process of additional testing to have cattle herds near the Yellowstone area certified as brucellosis free. Additional monitoring, consisting of regular testing of test-eligible cattle and adult vaccination of cattle herds are also included in the modified preferred alternative.

Representative Comment: 14379E, 14379, E, 14980J, 9586I

B Comment: Establish an APHIS-sanctioned brucellosis quarantine zone in the public lands in the Yellowstone ecosystem. Isolate this problem to the Yellowstone area.

Response: The three states surrounding the Greater Yellowstone Area have been declared brucellosis free by APHIS because brucellosis has been eliminated from the livestock in those states. Therefore, APHIS will not be imposing a quarantine zone in the area.

Representative Comment: 15137C

C Comment: APHIS should create a separate 10-mile area around Yellowstone National Park where cattle ranchers would have to vaccinate to maintain brucellosis-free status. The rest of Montana cattle would be unaffected and would retain brucellosis-free status.

Response: APHIS does not require vaccination in brucellosis class-free states. Vaccination is mandatory, by state requirement, in Idaho and Wyoming, and strongly recommended in Montana. Virtually all cattle herds in the Greater Yellowstone Area are vaccinated. In the modified preferred alternative for those cattle herds that graze during summer in areas where bison might be allowed in winter, vaccination of all test-eligible cattle is strongly encouraged. If 100% voluntary compliance is not achieved, Montana could make

vaccination of those cattle herds mandatory. APHIS would reimburse the producers for the direct costs of vaccination.

Representative Comment: 15238A

Issue 5: ***Limitations on Cattle Grazing***

A Comment: Maintaining Montana's class-free status might be accomplished by the control of grazing practices. Control of grazing is a way to manage exposure risk and could be implemented while a vaccine is being developed.

Response: Some of the alternatives focus to a greater extent on grazing practices than others. Alternative 2 (phase 2), for example, eliminates all susceptible cattle from the impact area. Other alternatives (2 and 3) propose possible modifications to grazing allotments to accommodate grazing bison. Cattle grazing can be controlled to some extent through the on/off dates as well. This particular strategy is a part of all alternatives where bison are allowed on public allotment lands outside the park. In the modified preferred alternative grazing on a private cattle lease north of the park boundary may be discontinued in the future, thereby eliminating the risk of transmission. However, adjustments to grazing allotments represent only part of a whole complement of measures in the modified preferred alternative designed to ensure spatial and temporal separation of bison and cattle and preventing bison-to-cattle brucellosis transmission.

Representative Comment: 2419A, 2419A, 11409a, D

Issue 6: ***Methods of Risk Management***

A Comment: Instead of slaughtering or shooting bison, use other methods of risk management, such as development of safe and effective vaccines for bison and subsidizing cattle vaccination.

Response: Both the techniques the commenter mentions and many other nonlethal methods are part of most alternatives. For instance, hazing and quarantine are effective alternatives to shooting, or to transporting seronegative bison to slaughter. As is done in the modified preferred alternative, management emphasizing spatial and temporal separation can reduce the number of bison killed. Testing can also help reduce the number of bison killed by allowing the release of test negative animals under certain circumstances when tolerance limits are exceeded and in some cases by potentially allowing for the relocation of some of these bison if a quarantine facility is established in the future. Since the three states in the vicinity of the Greater Yellowstone Area are classified as brucellosis class-free and cattle are tested at slaughter, cattle in those areas are not required to be tested before leaving the area. However, if it is determined that a cattle herd has been exposed to bison, the states are requiring that those herds be tested and in the modified preferred alternative, APHIS would pay for the costs of additional testing.

Representative Comment: 10319AD

Issue 7: ***Is Brucellosis Really a Disease Issue?***

A Comment: "More than a disease, this is an economic issue. It is driven primarily by 'class free' designation by the APHIS and sold under the perception of potential disease threat. Brucellosis in bison and elk poses no credible threat to western livestock production.

Response: Targeting brucellosis in cattle in the United States and other countries for elimination is because of its debilitating effects on livestock and potential for infections in humans; it is a disease issue. The U.S. has invested billions of dollars in the program to eliminate it, as have many other countries. APHIS, the agency in charge of this eradication of brucellosis effort, indicates they have very nearly

achieved the goal of eradication in cattle in the U.S. Brucellosis transmission from Yellowstone National Park bison to cattle would have economic effects on Montana livestock growers.

Representative Comment: 613A, 4781C

B Comment: The Montana livestock industry is concerned about the possibility of losing its class-free status whether or not the threat is real. The state's brucellosis class-free status has been and should be a livestock industry status, NOT a wildlife issue.

Response: The presence of bison from Yellowstone National Park in nonpark areas of Montana will not cause Montana to be downgraded from a class-free state. The brucellosis eradication program, which confers state status, currently only applies to domestic cattle and bison, not wild, free-roaming bison. The modified preferred alternative, as well as the other alternatives, would maintain Montana's brucellosis class-free status and employ a variety of measures to address the risk of brucellosis transmission to protect the economic interest and viability of Montana's livestock industry.

Representative Comment: 958C, 14440H

C Comment: The "Background" section of the "Purpose of and Need for Action" chapter should include additional information. Montana has been class-free since 1985. By that time, brucellosis in bison and elk had been documented, as were movements of both species out of the park; nothing has changed since then. Montana's cattle remained free of brucellosis, no other states imposed sanctions, and the bison herd had gotten larger. The only rational conclusion is that some political opportunity has arisen to suddenly make the health of the bison herd an issue, an opportunity that is not based on science or rational thought.

Response: In 1985 there was still a significant amount of brucellosis in livestock throughout the United States. Even at that time, there was concern about the brucellosis situation in Yellowstone National Park, and there was a lot of discussion on how to resolve the problem. The work on the *Draft Environmental Impact Statement* was initiated in 1990. Since that time, the brucellosis eradication program has progressed significantly in the rest of the country. At this time, the disease is almost eliminated from cattle. The modified preferred alternative emphasizes an adaptive management approach to bison management, using science and additional knowledge gained from management actions to maintain a wild, free-ranging bison population and to protect cattle from the risk of transmission of brucellosis.

Representative Comment: 14819L

Issue 8: ***Effect of Greater Yellowstone Area Wildlife as the Only Remaining Brucella Abortus Source after Eradication from Livestock is Completed***

A Comment: The *Draft Environmental Impact Statement* does not discuss the possibility of brucellosis transmission to cattle outside Montana. The risk is minimal as long as the current eradication for brucellosis in cattle is in effect. However, when brucellosis is eradicated from livestock, the risk will increase due to the presence of brucellosis in Yellowstone bison and complacency in the surveillance system. If brucellosis spreads from Yellowstone bison to cattle, movement of cattle between states and internationally will be affected.

Response: The intent of the brucellosis eradication program is to continue surveillance for a number of years after the disease is eliminated from livestock, at a level that will ensure that the disease is indeed not present, and/or has not been reintroduced.

Representative Comment: 7485D

B Comment: Brucellosis must be eradicated from the Greater Yellowstone Area to ensure that the U.S. becomes truly free of the disease. The sacrifices made to eradicate brucellosis from this country will be jeopardized by failure to complete the eradication program.

Response: As the rest of the U.S. has almost reached the goal of eradicating brucellosis from domestic livestock, more attention is being paid currently to brucellosis eradication efforts in the Greater Yellowstone Area. The eradication of brucellosis in the Greater Yellowstone Area is not within the scope of this bison management plan, but all alternatives, including the modified preferred alternative, would accomplish one of the nine bison management plan objectives of committing "to the eventual elimination of brucellosis in bison and other wildlife." (See volume 1, "Purpose of and Need for Action: Objectives and Constraints.")

Representative Comment: 8455A, 9020B

Issue 9: *Elk*

A Comment: Allow bison to roam on public land like elk do. Elk have done so for decades, with no threat to Montana's class-free status.

Response: Brucellosis in elk is primarily associated with elk that frequent feedgrounds. At those feedgrounds elk are congregated at a time when they may abort, and transmission of brucellosis is likely to occur. Otherwise, under normal circumstances in the wild, brucellosis is not a major problem in elk due to the behavior of elk at the time of parturition, which is very different from the behavior of bison. In bison birth occurs either in or very close to the herd. If a bison was infected with the *B. abortus* bacteria, this behavior increases the chance of exposure to the birth fluids and/or newborn calf, thus increasing the chance of transmission of brucellosis. Elk, on the other hand, isolate themselves from the herd and seek cover to give birth. The cow meticulously cleans the birth site after parturition. This behavior helps to minimize the risk of transmission of brucellosis to other animals. *B. abortus* appears to not be self-sustaining in elk herds that are not concentrated on winter feeding grounds (NAS 1998). (See "Wildlife: Brucellosis in Other Wild Ungulates" in this volume for more information.)

Representative Comment: 4577D

B Comment: Elk freely intermingle with cattle in Montana. They should have had their brucellosis-free status jerked a long time ago.

Response: The brucellosis eradication program, of which state status is a part, covers cattle and privately owned bison herds. Wild, free-roaming elk and bison are not included under the brucellosis eradication program standards. Contact between cattle and elk or wild bison is not sufficient grounds for a downgrade in brucellosis status. Such a downgrade can only take place after brucellosis is diagnosed in a cattle herd and certain provisions of the brucellosis regulations and the methods and rules for brucellosis eradication are not met.

Representative Comment: 14384N

C Comment: Is class-free status compromised by the presence of infected deer, elk, and moose in the area?

Response: As with bison, the mere presence of these animals will not cause the state brucellosis status to be downgraded. Such a downgrade can only take place after brucellosis is diagnosed in a cattle herd and certain provisions of the brucellosis regulations and the uniform methods and rules are not met. The brucellosis eradication program, of which state status is a part, currently only covers cattle and privately owned bison herds. Wild, free roaming bison, deer, elk, and moose are not included under the brucellosis eradication program standards.

Representative Comment: 14434D

Issue 10: ***Regionalization of International Trade Health Regulations***

A Comment: International trade health regulations are being developed on a regionalization concept, with the idea that well-defined boundaries restrict the commingling of diseased and disease-free animals. Montana, Wyoming, and Idaho producers are concerned about the lack of well-defined separation of diseased animals from domestic stock and range that may cause status reduction under regionalization. Under the regionalization program that APHIS is developing, Montana would be included with other states. The brucellosis status of one state would determine that of the whole region.

Response: As regionalization has not yet occurred, it is not possible to predict whether Montana, Wyoming and Idaho would be considered one region with the same status.

Representative Comment: 14835B, 15242A

Issue 11: ***Acquisition of Additional Lands/Easements***

A Comment: There should be no acquisition of additional lands/easements north of Gardiner or beyond the west boundary area. Such acquisition would "place the cattle industry in Montana and other surrounding states at greater risk for disease transmission and potential loss of class-free status from APHIS."

Response: At least four of the objectives address these concerns: objective 2 — clearly define a boundary beyond which bison will not be tolerated; objective 4 — commit to the eventual elimination of brucellosis in bison; objective 5 — protect livestock from the risk of brucellosis; and objective 6 — protect Montana's class-free status. Table 11 in volume 1 lists ways in which each alternative, including those alternatives that have land acquisition or easements (i.e., 2, 3, 7, and the modified preferred alternative) would meet each objective. All of the agencies that cooperated in preparing the management plan agreed that all of the objectives could be met under each alternative. For example, under the modified preferred alternative, measures to protect livestock from the risk of transmission include emphasizing the spatial and temporal separation of bison and cattle, monitoring movement, testing/slaughtering seropositive bison when tolerance limits are exceeded, vaccinating bison and cattle, and enforcing the boundaries. These measures were designed to protect Montana's class-free status and to prevent transmission of brucellosis to domestic cattle.

Representative Comment: 14886G

Issue 12: ***Transport of Bison Across State and International Lines***

A Comment: Ranchers currently, from what I understand, have a bison-free status, which makes it easy for them to transport bison across state and international lines. I don't see any barriers to this continuing this status for these ranchers, which I think is important and also allowing buffalo to graze freely.

Response: The brucellosis class-free status that has been conferred to the three states in the Greater Yellowstone Area currently applies to cattle herds and to privately owned, ranched bison herds, which also must be free of the disease in order for the state to achieve class-free status. No test is required for interstate movement of cattle or privately owned bison herds from class-free states.

Representative Comment: 14902D

Issue 13: ***Transporting Meat Across Borders***

A Comment: Montana's class-free status is intact and should not affect beef export across Montana's borders.

Response: Montana indeed has brucellosis class-free status. This status affects the movement of live cattle but does not affect the exportation of beef.

Representative Comment: 5861B

Issue 14: ***NEPA Review of the APHIS Brucellosis-Free Status Policy***

A Comment: The U.S. Environmental Protection Agency suggests that APHIS initiate a NEPA review of its brucellosis -free status policy.

Response: APHIS appreciates the U.S. Environmental Protection Agency comments and agrees that a nationwide review of the brucellosis eradication program might be useful in reviewing past performance and in developing future strategies. However, even if begun today, such a review would not be completed in time to provide a framework within which to evaluate this action.

Representative Comment: 14356I, 14356S

Cattle Vaccination (LO-30)

Issue 1: ***Recommended or Required Cattle Vaccinations***

A Comment: Many commenters supported a recommendation or a requirement that cattle within and adjacent to the SMAs or within the conflict zone be vaccinated. Some respondents supported vaccinating cattle with RB51, and others supported a publicized, subsidized program to have all ranchers in the area vaccinate their cattle.

Response: RB51 and strain 19 are approved for use in cattle. Both vaccines show similar efficacy and safety. RB51 has the advantage of not inducing false-positive test results. RB51 would be the vaccine of choice, and it is currently being used in cattle in the Greater Yellowstone Area. Livestock operators in the impact area voluntarily vaccinate 100% of their female calves now. As part of a program to further reduce the risk of transmission, the modified preferred alternative calls for continued 100% voluntary vaccination of all test-eligible cattle in areas where bison might be allowed to winter outside the park. If 100% vaccination is not achieved, the state of Montana could make vaccination of test-eligible cattle mandatory. APHIS would reimburse producers for the direct cost of vaccination.

Representative Comment: 823C, 476J, 1577B, 14700L, 7948E, 8616F

B Comment: The Park Service should require cattle to be vaccinated and eliminate grazing permits for public land around the park.

Response: The National Park Service does not have the authority to require vaccination or discontinue grazing permits on land adjacent to parks.

Representative Comment: 5198C

C Comment: If cattle are allowed in the park, they should be vaccinated against brucellosis.

Response: Cattle are not allowed in Yellowstone National Park.

Representative Comment: 8772C

D Comment: Surely the U.S. Forest Service, which holds 97% of the land in the Greater Yellowstone Area, can mandate cattle vaccinations and/or steer only operations on the allotments under its jurisdiction.

Response: The U.S. Forest Service does not have this authority. Some alternatives, such as alternative 2, do suggest modification of cattle operations and provide incentives to operators to use nonbreeding cattle, such as steers or spayed heifers.

Representative Comment: 14700L

E Comment: Vaccination of cattle in the Greater Yellowstone Area should be required.

Response: Federal regulations regarding cattle vaccination against brucellosis only apply to certain circumstances related to the interstate movement of cattle. The current federal requirements for vaccination apply only to certain cattle being moved into and out of class C and class B states and there are no such states at the present time. Some individual states do require vaccination. With certain exemptions, Wyoming requires that all cattle over 12 months of age be official calfhood vaccinates for a change of ownership to occur. With certain exemptions, Wyoming requires that all cattle imported into the state must be official calfhood vaccinates. Idaho has had a mandatory calfhood vaccination regulation since 1984. Idaho requires that imported cattle be vaccinated. Unvaccinated calves under 12 months of age may be imported, but they must be immediately vaccinated if they are at least 4 months old. With

certain exemptions, Montana requires that no female cattle over 4 months of age may be imported into the state unless they are officially vaccinated. Vaccination of cattle in the Greater Yellowstone Area is strongly encouraged. In the modified preferred alternative vaccination of cattle in areas near Yellowstone National Park in Montana is encouraged and may be required if 100% vaccination of test-eligible cattle is not achieved. APHIS would reimburse the direct costs of cattle vaccination in those areas where bison might be allowed in the winter and cattle would graze in the summer.

Representative Comment: 9025I, 2015C, 10520G, 9157D, 15420N, 16417F, 1470C

F Comment: Some commenters suggested vaccinating calves while others specified both cows and calves.

Response: Voluntary and possible mandatory vaccination of test-eligible cattle is called for in the modified preferred alternative. Calfhood vaccination of cattle calves is commonly done, but the modified preferred alternative also provides for additional adult vaccination of cattle herds if warranted.

Representative Comment: 171B

G Comment: There are no recommendations for vaccinating cattle that come in contact with bison.

Response: Vaccination following contact would not be effective. Vaccination before the contact is recommended and would lower the risk of transmission.

Representative Comment: 15673A

H Comment: The *Draft Environmental Impact Statement* does not advocate mandatory vaccination presumably because the minimal expense would be borne by the rancher. If cattle were vaccinated, the bison would pose no threat of brucellosis transmission.

Response: Many comments, such as the one above, imply that vaccination of Yellowstone National Park area cattle would eliminate the risk of transmission of brucellosis. Vaccination for brucellosis is a tool in disease risk reduction, and it is current APHIS policy to recommend the use of vaccine to reduce disease transmission. In the modified preferred alternative the vaccination of test-eligible cattle is strongly recommended and could be mandated by the state of Montana, with APHIS providing direct costs of the vaccination to the producer. However, since currently available vaccines do not provide 100% protection and future vaccines are not likely to provide 100% protection, other management techniques are included in the modified preferred alternative to virtually eliminate the risk of transmission. Some of these techniques emphasize temporal and spatial separation of bison and cattle to ensure no contact between the two species, tolerance of bison beyond park boundaries only during winter, strict enforcement of management zones to restrict bison movements beyond park boundaries, calfhood and yearling vaccination of bison to reduce brucellosis seroprevalence in the bison population, and increased monitoring and surveillance of cattle near the park that may occupy lands used by bison in the winter.

Representative Comment: 15874AV, 8889B

Issue 2: ***Cattle Vaccination and Brucellosis Transmission from Bison and Elk***

A Comment: The risk of bison-to-cattle brucellosis transmission has been nearly eliminated in Canada by risk management strategies, including required vaccination of cattle on private land. The same results can be expected in the Greater Yellowstone Area.

Response: Vaccination, as part of a comprehensive strategy, would reduce the risk of transmission of brucellosis to cattle. In addition to vaccination of cattle, the modified preferred alternative provides additional strategies to make it extremely unlikely that the transmission of brucellosis to cattle would occur. These additional strategies include spatial and temporal separation of bison and cattle through a

zone management approach that would limit the number and movement of bison in Montana, increase monitoring and surveillance of cattle near the park that may occupy lands used by bison in the winter, and require vaccination of calf and yearling bison with a safe and effective vaccine.

Representative Comment: 150B

B Comment: Vaccination would also protect cattle from elk with brucellosis.

Response: Vaccination would provide additional protection to cattle exposed to infected elk. However, the current vaccines used in cattle are not 100% effective.

Representative Comment: 991E

C Comment: There is a cattle vaccination program in Idaho to protect cattle from brucellosis-infected elk; Montana and Wyoming should have a similar program.

Response: The protection of cattle from brucellosis-infected elk is beyond the scope of this management plan. Individual states have the discretion and authority to initiate cattle vaccination programs to further reduce the risk of transmission from potentially infected elk.

Representative Comment: 9369F

D Comment: The perimeter-zone strategy outlined in the NAS study should include the collection of serologic data from cattle vaccinated with RB51. Doing so would more clearly establish whether transmission of *B. abortus* actually is occurring in the Greater Yellowstone Area.

Response: Transmission between bison and cattle in the impact area has not taken place for more than 50 years. Also, states in the Greater Yellowstone Area are all brucellosis free, indicating cattle-to-cattle transmission is not a possibility.

However, to ensure transmission between bison and cattle does not take place, cattle may be more intensively monitored, such as in the modified preferred alternative. The modified preferred alternative includes additional testing of cattle and calfhood vaccination and possible adult vaccination of cattle. With owner consent, APHIS would certify particular cattle herds that might occupy the impact area in the winter and that meet the certification requirements as brucellosis-free. As part of the modified preferred alternative, APHIS would pay for the additional testing and vaccination costs. Separate from the preferred alternative identified in the bison management plan, the collection of testing data from cattle is already occurring through the standard program surveillance procedures such as market (first-point) testing, slaughter testing, and diagnostic testing, which are designed to detect the transmission of brucellosis.

Representative Comment: 14819XX

Issue 3: ***Suggestions Regarding Who Should Pay for Cattle Vaccinations***

A Comment: The ranchers, park users, state of Montana, federal government, donations, or nonprofit funding should pay for vaccinating cattle and bison. If vaccination represents 2% of production costs, it is a worthwhile investment for ranchers.

Response: Ranchers pay for vaccination costs now (see volume 1, "Environmental Consequences: Impacts on Livestock Operations"), and all ranchers in the impact area voluntarily vaccinate. In the modified preferred alternative, APHIS would reimburse producers for direct costs of vaccination. All alternatives, including the modified preferred alternative, also require vaccination of calf and yearling bison with a safe and effective vaccine in an effort to reduce seroprevalence in the bison population. Costs for vaccination of bison in the modified preferred alternative are estimated at $330,500 (see volume 1, "The Alternatives: Modified Preferred Alternative").

Representative Comment: 22B, 149F, 272A, 393D, 1207D, 471A, 424D, 8626F, 9058M, 15131AG

Issue 4: *Vaccine Efficacy*

A Comment: What is the efficacy of RB51 in cattle?

Response: Research has shown the efficacy of RB51 in cattle is similar to that of strain 19, e.g., 65% to 70% protection against infection with field strain *B. abortus.*

Representative Comment: 14819I, 306B, 2376B

B Comment: A completely effective vaccine for cattle is far more achievable than one for bison at this point.

Response: Studies completed to date do suggest that current vaccines may be more effective in cattle than in bison. However, they will likely never be 100% effective. This is due to the characteristics of the bacterial organism that causes the disease. Much effort is currently being put into the development of new vaccines. APHIS Veterinary Services and Agricultural Research Service are conducting as much research as possible on vaccines with allocated funds.

Representative Comment: 6953G, 8351G

Issue 5: *Historical Use of Brucellosis Vaccine in Cattle*

A Comment: Most ranchers vaccinate their cattle against brucellosis and have for decades. Why are they no longer doing so?

Response: Vaccination of cattle for brucellosis has not been discontinued. It is very likely that the majority of ranchers in Wyoming, Idaho, and Montana still vaccinate their cattle for brucellosis.

Representative Comment: 4573B, 6815D, 7373B

B Comment: A brucellosis vaccine for cattle is available now and has been successfully used widely in Wyoming.

Response: This is true. Strain 19 vaccine has been available for over 50 years and has been widely and successfully used. A new vaccine strain, RB51, approximates the efficacy of strain 19 but has the advantage over strain 19 of not causing false-positive blood tests in some animals.

Representative Comment: 13459C

C Comment: The *Draft Environmental Impact Statement* must disclose the number (and proportion) of cattle vaccinated annually in the conflict zone.

Response: Accredited veterinarians are required to report calfhood vaccinations for brucellosis; however, it is recognized that not all do as required. It is probable that not all vaccinations are reported in the states. Idaho records indicate that well over 300,000 calves are being vaccinated annually, and this may be as high as 95% of the total number of heifer calves. Wyoming cattle population figures and vaccination reports indicate that at least two-thirds of the heifers are being vaccinated. The most recent data available from Montana show that in calendar year 1997 a total of 368,438 calfhood vaccinations for brucellosis were reported and recorded. This represents 50% of the estimated number of heifer calves born that year. It is also important to recognize that a number of heifer calves born in the area do not stay but may be going to feedlots. Those animals are less likely to be vaccinated. However, 100% of livestock operators in the immediate impact area of Montana voluntarily vaccinate calves.

Representative Comment: 14819T

Issue 6: *RB51 vs. Strain 19*

A Comment: It must immediately be made illegal to use strain 19 in domestic livestock. Otherwise, the question of whether domestic livestock are actually infected with *B. abortus* cannot be addressed with certainty.

Response: It is true that the use of strain 19 makes a diagnosis more difficult, since as it will occasionally cause the standard card test to be positive. However, it is usually possible to determine the cause of titers by the use of herd and animal history, cultures, epidemiology, and supplemental testing. Many states have prohibited the use of strain 19 vaccine, and present use is limited.

Representative Comment: 10616H

B Comment: When given to pregnant cattle, strain 19 infects the placenta and can cause abortion.

Response: This is true, but only in a very small number of cases.

Representative Comment: 14819J

C Comment: Some livestock producers (e.g., in Wyoming) are not willing to switch from strain 19 to RB51 for their cattle. Others will not use RB51 in their ranched bison. Canadian livestock agency officials passed a resolution opposing its use.

Response: It is true that some Wyoming ranchers in the Greater Yellowstone Area are still using strain 19. Idaho discontinued the use of strain 19 in June 1997. Neither strain 19 nor RB51 is presently approved for use in bison. Both strain 19 and RB51 provide protection from exposure to brucellosis.

Representative Comment: 15420EI

Issue 7: *Vaccination Frequency*

A Comment: If cattle are vaccinated every year, it seems they should be immune to brucellosis.

Response: Increasing the frequency of vaccination appears to increase immunity. More research and data will be needed to determine vaccine efficacy with respect to one-time or annual booster vaccinations.

Representative Comment: 10850C

B Comment: Grazing cattle may be given a once in a lifetime vaccination that will prevent them from contracting the disease.

Response: Current protocols call for a one-time vaccination, and research has shown current vaccines are 65% to 70% effective against direct exposure to infectious doses of *B. abortus* bacteria.

Representative Comment: 11011B

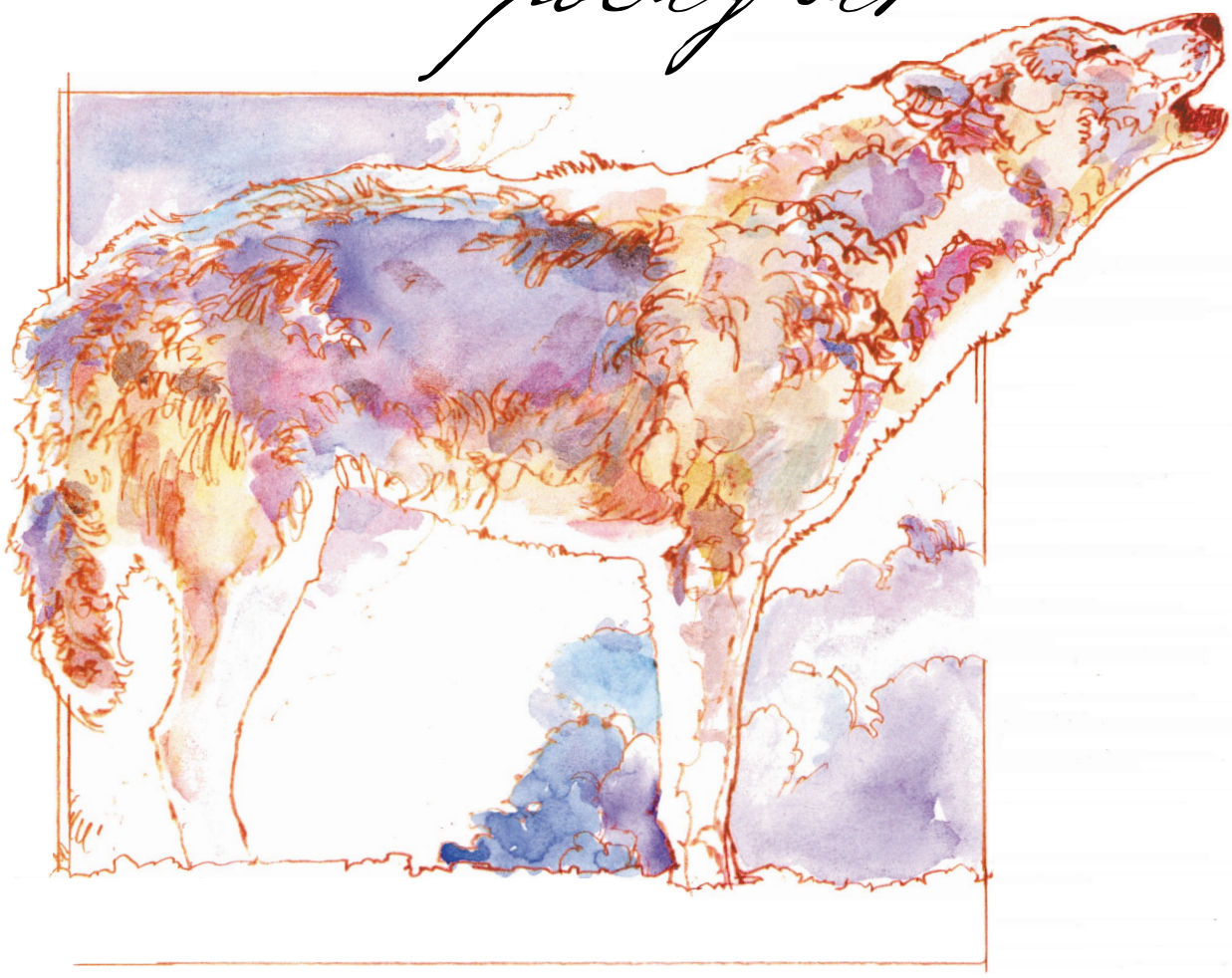
Issue 8: *Brucellosis is Not Incurable*

A Comment: This is not an incurable disease.

Response: There is no practical way of being sure that an infected cow is rid of the disease. Brucellosis may be eliminated from cattle herds by test, slaughter, vaccination, and good management practices, but the treatment of individual cattle is not practical in an eradication program.

Representative Comment: 13471E

National environmental policy act



New Alternatives/Issues (NE-4)

Issue 1: ***The Public Input Process***

A Comment: Is there any proposal for additional public input or reaction to alternatives before a final decision is made?

Response: The final environmental impact statement will be available for the public for a minimum of 30 days before any decision is made binding by a signature of the record of decision. In addition, separate NEPA processes, some of which would "tier" from this programmatic environmental impact statement for the overall plan, are likely to evaluate quarantine locations and procedures or other features of implementing the plan.

Representative Comment: 214J

B Comment: Most hearings were scheduled in the western United States; some were scheduled in Washington, D.C. This means input will be lopsided with local private interests, local landowners, and cattle ranchers dominant.

Response: Although hearings may have been located primarily in the West or Midwest, the *Draft Environmental Impact Statement* was available to anyone in the U.S. or abroad requesting a copy. Comments were taken from anywhere in the world for a period of six months. Results of this public involvement effort show many thousands of comments were received from individuals living in eastern states, and hundreds from countries in Europe, Africa, South America, and Asia, as well as from Australia, Canada, and Mexico. The comments were by no means dominated by local private interests or cattle ranchers; in fact, more than 47,000 comments of 66,000 that were received supported the "Citizens' Plan." Another 1,600 comments supported "Plan B," and 4,800 were in favor of the "Bison Alternative," all of which promote the management or removal of cattle from public and private lands in the impact areas.

Representative Comment: 786A and 15874a F

C Comment: The *Draft Environmental Impact Statement* advances alternatives that don't reflect public comments received during the scoping process, and all fail to acknowledge the lack of evidence that transmission occurs.

Response: As noted above, the *Draft Environmental Impact Statement* includes alternatives suggested by the public as well as a number of issues described in the "Purpose of and Need for Action: Scoping Process and Public Participation." Those that were suggested but not further analyzed are explained there as well. The *Draft Environmental Impact Statement* does acknowledge a lack of evidence that transmission occurs in the wild. This acknowledgement is in "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison (Alternative Interpretation of Risk)," which notes: "Those who suggest that the risk is negligible point out that there have been no documented cases of brucellosis transmission from wild, free-ranging bison to cattle" (see DEIS, p. 20 and in this volume, "Bison: Brucellosis Transmission and Public Perception" and "Wildlife: Brucellosis in Other Wild Ungulates" for more information).

Representative Comment: 15420A

D Comment: The agencies must commit to a public input process before any bison vaccine is used.

Response: The agencies will have a public input process in the form of a National Environmental Policy Act analysis, if the use of the bison vaccine has the potential for environmental impact. However, the agencies have agreed to use only a safe vaccine on bison and only a safe and effective one on bison in the wild. The criteria defining "safe" are included in the final environmental impact statement (see volume 1, "The Alternatives: Actions Common to All Alternatives").

Representative Comment: 15420FI

E Comment: The agencies deliberately discounted public comments from scoping, including public values, concerns, objectives, and methods to implement them. This undercuts meaningful public participation.

Response: No deliberate discounting of public input has occurred. However, as noted above, it is ultimately the agencies responsible for managing bison who determine the purpose of taking action, the objectives guiding decisions, whether alternatives are reasonable, and which environmental issues need to be discussed in detail. The public provides input into the process at the scoping and DEIS stages at a minimum, and we believe the public input to this EIS process has been quite valuable and useable in reshaping the preferred alternative, as well as in adding new information or clarifying existing information in the environmental impact statement.

Representative Comment: 15420L

F Comment: Bring the public into the process and adopt the "Citizens' Plan" or start over.

Response: As noted above, the public has been brought into the process on several occasions. Your remaining comments are noted.

Representative Comment: 15874AII

Issue 2: ***The Preferred Alternative***

A Comment: What is the rationale for selecting alternative 7 as the preferred?

Response: The preferred alternative was the one the agencies could agree met their respective needs to the greatest degree. The state of Montana was concerned that bison were traveling into its jurisdiction and near cattle; therefore, it asked that a cap be put on the population to minimize the chances that bison would migrate out of Yellowstone National Park, e.g., their winter forage needs would be met inside the park. Capture facilities were integral to this strategy to keep numbers of migrating bison low. The park was concerned that bison have adequate winter grazing to support the size of the population that wildlife biologists believe can exist inside the park boundaries during the remainder of the year. Therefore, the acquisition of lands to the north and control of public cattle allotments to the west were included as part of the preferred alternative. The U.S. Forest Service was concerned that allotments on lands under its control could not be changed or eliminated without severe impacts on the ranchers using them. All agencies agreed to include quarantine to offer the option of transferring bison to other public or tribal lands, rather than killing seronegative bison attempting to cross out of SMAs. Since the time the *Draft Environmental Impact Statement* was published, the state and federal agencies could not agree on a preferred alternative; therefore, each has developed a preferred approach that differs from alternative 7. The modified preferred alternative in the final environmental impact statement is the federal agencies' approach and is the new preferred alternative. The rationale for its being preferred is described in volume 1, "The Alternatives: Modified Preferred Alternative." It is presumed that the alternative described in "The Alternatives: October 24, 1999, Alternative Submitted by Montana" is Montana's preferred approach.

Representative Comment: 214H

B Comment: Where is a discussion of why alternative 2 doesn't protect livestock concerns and is not preferred. The EIS should include the criteria and rationale for the selection of the preferred alternative.

Response: The rationale for initially selecting alternative 7 as preferred is identified above in comment 2A. Alternative 2 would allow bison out of Yellowstone National Park over a wider area, and it would change cattle operations on private and public land. The modified preferred alternative would allow bison over a wider area than alternative 7, but it would also manage population size. It is an adaptive management approach to bison management that would allow agencies to learn from previous steps so that a manageable

number of untested bison could be allowed to roam freely in established zones in winter range outside the park.

Representative Comment: 14739A

C Comment: The preferred alternative should be voted on by the public.

Response: The public expresses its opinion on which alternative is best by writing in or speaking at public hearings on the environmental impact statement. The record of this opinion is part of what goes to the decision makers in their final choice of an alternative.

Representative Comment: 10033D

D Comment: It is troubling that the agencies have already selected the preferred alternative. The process should be more even-handed.

Response: A *Draft Environmental Impact Statement* is required to indicate the agencies' preferred alternative. This alternative is not the final selected alternative, but simply gives the public an indication of where the agencies are leaning in their decision making at the time the draft is released. The agency decision makers can change their mind between draft and final environmental impact statements, and often do so based on public comments and new information, as is the case with the bison management plan. The federal agencies have adopted suggestions made by the public to minimize lethal controls, acquire additional winter range, and allow bison outside Yellowstone National Park in the modified preferred alternative.

Representative Comment: 10283O

E Comment: When will the public know if the "Citizens' Plan" or another alternative is the final selection, and when would it go into effect?

Response: The selected alternative will be identified as part of the record of decision. This record of decision is signed following a 30-day minimum waiting period after the final environmental impact statement has been released to the public.

Representative Comment: 715A

Issue 3: ***Improper Segmentation of Issues***

A Comment: The *Draft Environmental Impact Statement* incorrectly segmented bison and cattle interaction in Wyoming and Idaho.

Response: Additional information on bison and cattle in Wyoming and other states are included in this final statement, see "Alternatives: New Alternatives/Issues" in this volume. Also, information on socioeconomic impacts to gateway communities and on bison distribution in Wyoming is included in "Environmental Consequences: "Impacts on Socioeconomics — Summary of Benefits and Costs" in volume 1.

Representative Comment: 4427B

B Comment: The *Draft Environmental Impact Statement* incorrectly segmented the discussion of the brucellosis reservoir in bison from that in elk and deer.

Response: A complete discussion of brucellosis in elk and other ungulates is presented in the final environmental impact statement (see volume 1, "Purpose of and Need For Action: Background — Brucellosis in Cattle and Bison (Brucellosis in Other Wild Ungulates)" and in this volume, "Wildlife: Brucellosis in Other Wild Ungulates."

Representative Comment: 4427B, 14305G

C Comment: Elk and bison are linked, and the following should be analyzed in the environmental impact statement:

1. Do elk pose the same risk to cattle?

2. Would agencies keep elk confined to the same SMAs as bison? The ability of infected elk to move at will defeats the purpose of creating SMAs.

3. What is the impact of a winter feeding program for elk? How does it facilitate the infection rate, what would be the impact of stopping the programs?

4. What is the relative difficulty between capture and test of bison vs. elk?

Response: Please see sections cited in 3B above for more information on brucellosis in elk.

Representative Comment: 11409AX

D Comment: The GYIBC effort to control brucellosis in the Greater Yellowstone Area in elk is the larger effort. The control of the disease in bison should fit into this plan and come after this plan rather than vice versa.

Response: The agencies acknowledge that the management of brucellosis in the Greater Yellowstone Area is of high importance. The immediate concern, however, is addressing the disease in the Yellowstone National Park bison herd as it relates to the potential effect on livestock. Efforts such as the GYIBC study and others will still be needed to address management of the overall problem in the Greater Yellowstone Area, such as the feeding ground for the Jackson elk herd.

Representative Comment: 14305Q

E Comment: The *Draft Environmental Impact Statement* improperly segments the discussion of quarantine and multiple trapping facilities for a future NEPA process. This environmental impact statement should disclose the location and impacts of both; if no analysis is performed, the agencies should not consider these as options.

Response: The NEPA regulations promulgated by the Council on Environmental Quality encourage the use of "tiering," that is, examining the impacts of programs, policies, or plans in one NEPA document and then referring back to that document when examining a piece for implementation in a subsequent NEPA document (CEQ 1508.28). In this case the agencies are examining the impacts of quarantine as a management tool for bison — a programmatic or planning decision. The impacts of such a choice are analyzed in this environmental impact statement, particularly on the bison population because this is the resource affected by such a policy choice. If quarantine is chosen as part of the selected alternative, the agencies would prepare a tiered or separate NEPA document to examine alternative types of facilities and locations, that is, the site-specific details. Tiering allows agencies to focus on issues "ripe for decision and exclude from consideration issues . . . not yet ripe."

The location and impact of multiple capture facilities is a similar problem. The agencies have not yet decided whether multiple capture facilities, as described in alternatives 5 and 6, would be a preferred choice; they are simply trying to decide whether the set of tools and results predicted in these two alternatives are the management direction they wish to choose. The siting of each capture facility inside Yellowstone National Park would be guided by a set of criteria (see "The Alternatives: Actions Common to All Alternatives" in volume 1). These criteria ensure that the capture facilities would have no significant impact — a policy that the park was able to commit to without input from the other agencies, unlike a quarantine facility. The park would be bound to abide by these criteria in siting facilities, should either of these alternatives be selected.

Representative Comment: 14714R

F Comment: The environmental impact statement improperly segments quarantine and protocol; the impacts of the protocol should be discussed in this environmental impact statement, as should factors the agencies would use to site a quarantine facility.

Response: The impacts of quarantine protocol are discussed under "Environmental Consequences: Impacts on Bison Population" in volume 1. Again, as described above, the factors the agencies would use to site a quarantine facility are not "ripe for decision" at this time. First, the agencies need to decide whether quarantine is an appropriate management tool for bison.

Representative Comment: 14819B

G Comment: The environmental impact statement improperly segments the discussion of impacts of vaccination. The agencies are developing a bison vaccine now, and all alternatives assume the use of a vaccine. Now is the time to analyze impacts, before a decision to vaccinate is made.

Response: As with the capture facilities, the agencies have applied criteria to the use of a bison vaccine. These criteria are described in the environmental impact statement ("The Alternatives: Actions Common to All Alternatives — Vaccination" in volume 1) and include that a vaccine would have no long-term pathological effects on the bison or its fetus or any debilitating reaction that would increase mortality in the bison population. The bacteria would incur no genetic mutations or reversions and would cause no pathological effects, death, or disability in nontarget animals. We believe the application of these criteria would prevent environmental impacts, and it is with this constraint in mind that the agencies agree bison would be vaccinated. In effect, the impacts have been "analyzed" and are negligible; otherwise, the vaccine would not be used.

Representative Comment: 14714S

Issue 4: ***Decisions Before Analysis Complete***

A Comment: It is predecisional and therefore a violation of National Environmental Policy Act to seek and obtain money for a quarantine facility, or to seek money to continue capture, test, and slaughter operations before finalizing this environmental impact statement.

Response: Capture, test, and slaughter operations are authorized by the *Interim Bison Management Plan* and its *Environmental Assessment*; therefore, seeking money to continue these operations is not a violation of National Environmental Policy Act. Although funding has been allocated for a quarantine facility, the agencies cannot implement any aspect of building it until this EIS process is concluded and another planning process, through the National Environmental Policy Act, or Montana Environmental Policy Act, is completed.

Representative Comment: 10682H

Issue 5: ***Purpose of and Need for Action***

A Comment: It is inappropriate to consider socioeconomics in structuring the need for action.

Response: We disagree. The need for action comes from each of the agencies charged with managing bison and brucellosis. The state of Montana has an interest in managing bison to protect its cattle from contracting the disease, a situation which, if uncontrolled, could result in adverse economic impacts. The federal agencies also have an obligation to address the socioeconomic impacts of its actions and decisions, as required under the National Environmental Policy Act.

Representative Comment: 9803AA

B Comment: The alternatives would not result in a wild or free-ranging population as defined by *Webster's* (Wild = not amenable to control or restraint; living in a state of nature and not ordinarily tame or domesticated). It is arrogant to think you can "manage" something in a wild and free condition, as the management itself destroys the wildness.

Response: We believe the bison would remain wild as you have defined it. The herd would not be routinely handled, controlled, or restrained inside Yellowstone National Park, a wilderness of over two million acres. When they exit, under some alternatives, they would be captured, tested, and released or sent to quarantine or slaughter. This does not describe "tame" or "domesticated" bison. The agencies agree with you that hands-on fencing or roping or corralling or confining bison for a long period of time would destroy their wildness. This is one of the reasons why bison would not be returned to the park after completing the quarantine protocol.

Representative Comment: 10682D, 14714I, 9092B

C Comment: The purpose is not to eradicate brucellosis, only to address the risk of transmission so Montana's livestock industry is protected. The environmental impact statement does not demonstrate that this industry is currently threatened, so no action is needed to accomplish this part of the purpose.

Response: The industry is threatened only if there is some risk (or, perception of risk, in the case of some state veterinarians) of the transmission of brucellosis between bison and cattle. Although transmission between the species in the wild has not occurred, it has occurred under experimental confined conditions. Therefore, the agencies have assumed that although the risk of transmission is extremely low, it is possible, and they are managing for this possibility.

Representative Comment: 13321E

D Comment: The preferred alternative is the antithesis of the stated purpose and ignores the statement "periodic migrations into Montana are natural events."

Response: We disagree and believe all alternatives fulfill the stated purpose, although it is true that some emphasize the "wild and free-ranging" element and some the protection of the economic interest and viability of the livestock industry.

Representative Comment: 15329C

E Comment: How can alternatives involving hazing, shooting, vaccination, capture, quarantine, etc. maintain a wild and free-ranging population?

Response: Wild is defined as "not routinely handled," and free-ranging as "move without restrictions within specific geographic areas." Each alternative has some large area (the minimum is the two million acres of Yellowstone National Park) where bison are able to move without restriction; and although alternatives might include routine handling of some individual bison (seropositives leaving the park, primarily), each would also preserve a wild population of bison. It is true that there are restrictions on bison movement in each alternative, and that routine handling of some portion of the population would occur in all alternatives except alternatives 2 and 3 (phase 2) in the form of the capture and removal of seropositives to slaughter. However, in most alternatives, these management techniques would apply only to those bison leaving the park. The majority of the herd would remain inside the park, untouched by human management. For alternatives 5 and 6, only seropositive bison would be routinely handled, as they were captured, confined, sorted, or trucked to slaughter. Seronegative bison would be captured, tested, marked, and released back into the park — a process that takes a few hours. The vaccination of certain bison inside the park would be conducted through remote means — capture or confining would not be required.

Representative Comment: 15332C

F Comment: Only alternatives 5 and 6, which result in the elimination of brucellosis, fulfill the stated purpose of protecting livestock from the risk of brucellosis.

Response: We disagree. The stated purpose is to "address the risk of brucellosis" and to "protect the economic interest and viability of the livestock industry" in Montana. The elimination of brucellosis is not an objective of the plan. The agencies view this as a risk-management effort, rather than one of risk elimination. Each alternative is geared to prevent the transmission of brucellosis from bison to cattle through a variety of techniques, including temporal and spatial separation of the two species, population control efforts to keep bison from leaving Yellowstone National Park or SMAs, and the management of cattle to eliminate susceptible livestock. The techniques have protected cattle from brucellosis in the past, and we believe they would continue to do so.

Representative Comment: 11121O

G Comment: The true need for action is the brucellosis-free policy of APHIS.

Response: It is true that the economic interest and viability of the livestock industry in Montana is in part linked to the interest in maintaining the brucellosis class-free status that Montana has attained in the Brucellosis Eradication Program. APHIS has made a number of commitments in the modified preferred alternative to address the Yellowstone bison herd within its authorities and abilities to resolve the problem.

Representative Comment: 14305I, 14305S

Issue 6: ***Range of Alternatives***

A Comment: The alternatives are too similar and do not fulfill the requirement for a full range. The team simply took one alternative and modified it for all alternatives except phase 2 of alternative 2, and alternatives 5 and 6.

Response: The exceptions you mention are the opposite ends of a full range. Alternative 2 relies on the management of cattle to reduce the risk of transmission, and alternatives 5 and 6 rely completely on the management of bison. Given that all alternatives must accomplish the purpose of taking action and, therefore, meet the stated objectives and be within agency mandates, this is a full range of reasonable options. The other alternatives fall midway between 100% bison management and 100% cattle management and are more difficult to distinguish.

The agencies were careful that each management technique (such as hunting, quarantine, capture, test, and slaughter) was analyzed in at least one alternative and that at least one alternative not including the technique was analyzed for comparison. We believe this provides analysis of impacts of the full spectrum of feasible management options for agency decision makers.

Representative Comment: 14714U

B Comment: The environmental impact statement needs to have an alternative that assumes the risk of transmission is nonexistent or minimal — then livestock owners would take steps to manage risk by immunizing cattle, maintaining fencing, vaccinating, etc.

Response: The environmental impact statement includes an alternative that relies on the management of cattle to reduce the risk of transmission of brucellosis from bison. This is phase 2 of alternative 2. Cattle in the impact area are already immunized, vaccinated, and fenced — the steps outlined in alternative 2 (and to a lesser extent in alternative 3) would be in addition to these.

Representative Comment: 14775I

C Comment: Agencies are required to study all alternatives that appear reasonable and appropriate for study, as well as significant alternatives suggested by other agencies or the public in enough detail for the public and decision makers to make reasonable alternatives. This wasn't done in this environmental impact statement.

Response: We disagree. The agencies used the process for decreasing the purpose of and need for action, objectives, constraints imposed by agency mandates, and input from the public to define the appropriate range of reasonable alternatives. This is part of scoping the appropriate "size" of the analysis. Alternatives that did not accomplish the purpose of taking action were considered unreasonable. Alternatives not within agency mandates were also considered unreasonable, unless the possibility of changing the policy or mandate was likely. Given these assumptions, alternatives at either end of the spectrum were established. These are alternative 2, which relies on the management of cattle to achieve objectives and favors a wild and free-ranging bison population to a larger degree than other alternatives; and alternative 5, which relies on the intensive management of bison and favors the protection of "the economic interest and viability of livestock industry" portion of the purpose statement. Despite achieving certain objectives to a greater degree than others, both alternatives 2 and 5 also accomplish the purpose of taking action. In other words, although alternative 2 favors a wild and free-ranging bison population, it would also protect the economic interest and viability of Montana's livestock industry. Six alternatives within the range were created to analyze each of several management techniques. They were structured so that it was clear what the impacts of each technique would be, and how alternatives without these management options would function for comparison purposes. For instance, the impact of quarantine is clear from comparing alternatives 1 and 4, as they are very similar except for this feature. More detail on the range of alternatives and the "theme" of each is available in "The Alternatives: Introduction" (pp. 51–3 of the *Draft Environmental Impact Statement*).The alternatives most favored by the public are within this range. Alternative 3 is very similar to that suggested by a citizens' group in the early 1990s, and remains similar to the "Citizens' Plan" (see "Alternatives: Citizens' Plan" in this volume), submitted by a number of organizations and favored by a number of individuals today. An alternative similar to alternative 6 is supported by state veterinarians and Montana stockgrowers. However, some alternatives, such as the Bison Plan, "Plan B," or the elimination of brucellosis in bison and elk, are outside the reasonable range as they violate one of more of the objectives the agencies agreed must be met for an alternative to be feasible. Although elements of these alternatives are reasonable and are analyzed further in this environmental impact statement, these alternatives as a whole are not and therefore are not considered further. We believe that this is the prescribed method for framing the correct range of reasonable alternatives and that those presented in the environmental impact statement illustrate the full spectrum of feasible possibilities.

Representative Comment: 14819C

D Comment: Discretionary culling could be avoided through nonlethal means, and the environmental impact statement must be broadened to include an alternative using only nonlethal methods of control. There is no evidence that transmission from bison is any different than from elk, yet elk roam freely.

Response: Alternative 2, which is the closest to a nonlethal alternative, is carefully constructed to ensure susceptible cattle are removed from lands where bison may roam. It does not depend on fencing or vaccination, as these are less-reliable methods of preventing transmission. Bison are shot when they try to leave the SMA boundary — this keeps population numbers lower and controls distribution. Under these circumstances, the agencies expect bison would return to the park during the spring and would not threaten unprotected cattle outside the SMAs.

A discussion of the differences between elk and bison is presented in this volume under the topics "Wildlife: Brucellosis in Other Wild Ungulates" and "Bison: Brucellosis Transmission and Public Perception."

Representative Comment: 14305A

E Comment: The environmental impact statement needs a no-grazing alternative. This makes the most sense economically and biologically, because there is no subsidy of cattle (intense management to provide a risk-free environment is a subsidy of cattle).

Response: Alternative (phase 2) is a no-grazing alternative within the boundaries imposed by objectives and constraints.

Representative Comment: 14540G

F Comment: The alternative should be more creative in balancing competing interests, including those of bison.

Response: Without concrete suggestions, we have no reason to believe we have not covered the full range of reasonable alternatives. In other words, we have been as creative as the constraint of reasonableness allows us to be.

Representative Comment: 2921C

G Comment: The objectives in the environmental impact statement require human-induced mortality to be a part of all alternatives. They should be changed so that an alternative relying only on natural mortality is included — otherwise, the environmental impact statement does not have a full range.

Response: This is similar to "Plan B" and the "Bison Alternative." Please see this volume, "Alternatives: Bison Alternative" and "Alternative Plan B" for more information. In summary, the agencies do not believe relying only on natural mortality would protect Montana's livestock in the impact area from the risk of brucellosis transmission from bison.

Representative Comment: 14700D

Issue 7: ***The No-Action Alternative***

A Comment: The true no-action alternative, as defined by federal law and regulations, is minimal or no management.

Response: The Council on Environmental Quality states that the interpretation of no action is different for a plan than for a policy. The bison management plan is essentially an updating of existing policies laid out in a series of *Interim Bison Management Plan*s. According to the Council on Environmental Quality, no action in this case is "no change from current management direction or level of management intensity."

Representative Comment: 14439C, 4102H

B Comment: If the environmental impact statement uses a continuation of the interim plan as no action, it needs to include adjustments made in late 1997. If the *Environmental Assessment* for the interim plan is found to be inadequate, the environmental impact statement must delete it as an alternative.

Response: The adequacy of the interim plan's *Environmental Assessment* has been tested in court, where it was found to be adequate. Changes in the interim plan have been incorporated into alternative 1 (see volume 1, "The Alternatives").

Representative Comment: 14980V

C Comment: "No management" wasn't analyzed because it violates some interagency agreement. Does this agreement take precedence over the requirements of National Environmental Policy Act?

Response: The National Environmental Policy Act has no requirement to analyze a no management alternative, and so no NEPA provisions have been violated by not analyzing one.

Representative Comment: 14600C

Issue 8: ***Required Sections of the EIS***

A Comment: Where is the preparer's list?

Response: It is on page 321 of the *Draft Environmental Impact Statement*.

Representative Comment: 1542A

B Comment: Where is the summary of legislative and regulatory requirements cited in part 1?

Response: They are in "Constraints in Taking Action" on pp. 30–4 of the *Draft Environmental Impact Statement*.

Representative Comment: 181B

Issue 9: ***Additional NEPA Requirements***

A Comment: A supplemental environmental impact statement must be prepared to analyze the "Citizens' Plan," more in-depth impacts to tribes, impacts to livestock operations, impacts to tribal cultural resources and landscapes.

Response: Additional information on these topics relative to the EIS alternatives is presented in this final environmental impact statement. In addition, the "Citizens' Plan" is examined in volume 1 "The Alternatives" chapter. For a supplement to be required, the information must be "significant," "relevant to environmental concerns," and "bear on the proposed action and its impact" (CEQ regulations at 40 CFR 1502.9 (c)). The agencies do not believe the information you have requested falls into this category.

Representative Comment: 11409AF

B Comment: Where were existing capture facilities analyzed in a NEPA document? If they have not been, the agencies cannot grandfather them into this environmental impact statement.

Response: The Horse Butte facility on U.S. Forest Service land was analyzed in an *Environmental Assessment* dated December 14, 1998. The decision to build the facility was signed in a "Decision Notice and Finding of No Significant Impact" by Gallatin Forest Supervisor David Garber on January 29, 1999. The Stephens Creek facility was analyzed in an *Environmental Assessment* for the *Interim Bison Management Plan*. A state-run facility on the west side was not analyzed in a NEPA document, as no federal involvement occurred.

Representative Comment: 11409AAA

C Comment: A supplemental environmental impact statement must be prepared to analyze the modified alternative 6 proposed by the USAHA (United States Animal Health Association).

Response: The CEQ regulations require that a supplement be prepared if the agencies make "substantial changes in the proposed action relevant to environmental concerns," or "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts," is uncovered (40 CFR 1502.9). The environmental impact statement has analyzed alternative 6 and alternative 5. The agencies believe that the modified alternative 6 would fall between the two in terms of its impacts. If the agencies were to adopt the USAHA alternative as the new preferred alternative, and found some elements of it had significant and different impacts than any alternative analyzed in the environmental impact statement, a supplement would be issued.

Representative Comment: 11121BB

D Comment: A supplemental environmental impact statement should be prepared so the public can review new alternatives analyzed.

Response: As described above, if any of the alternatives suggested by the public contained elements that would result in potentially significant and different impacts from those analyzed in any of the alternatives in the impact statement and that alternative was selected as the new preferred, a supplement would be issued.

Representative Comment: 14305H

E Comment: The agencies need to rescind the environmental impact statement or do a supplemental environmental impact statement to correct many substantive legal inadequacies, including the discretion of the state vet, because his/her action can invalidate much of the impact analysis.

Response: The agencies do not believe that the environmental impact statement has substantive legal inadequacies or that new information triggers the need for a supplemental or rescinded environmental impact statement in this case.

Representative Comment: 14714G

F Comment: Changing allotments to eliminate grazing would require additional NEPA compliance and modification of the forest plan.

Response: A change in livestock operations on an allotment would require the National Environmental Policy Act or forest management plan modifications only if there were significantly different environmental effects. Forest Service NEPA decisions are based on forage and habitat issues (FSH 2209.13.16).

Representative Comment: 9364N

G Comment: This environmental impact statement should contain information not in the *Environmental Assessment* for the *Interim Bison Management Plan* on the impacts of holding bison at the Stephens Creek capture facility, as this sounds like a precursor to quarantine. Include the number held, sex, age, how many are seropositive, how many were released, where were they held, how many bison can be accommodated, and means used to keep seronegative bison separate from new bison.

Response: Holding bison at the Stephens Creek facility is an emergency measure and not a precursor to quarantine. In the past, it has happened only when population numbers are so low that the herd is threatened and when winters are so severe that the herd continues to attempt to find winter forage by exiting Yellowstone National Park (where they are captured and sent to slaughter or shot). Bison are overwintered and released in the spring when green-up begins.

Representative Comment: 11409ABB

Issue 10: ***Concurrent Planning Efforts***

A Comment: Other planning processes affecting this one, and their impacts, should be included.

Response: A discussion of other ongoing planning efforts has been updated and is found in "Purpose of and Need for Action" of volume 1.

Representative Comment: 14305G

Issue 11: ***Cumulative or Regional Effects***

A Comment: The environmental impact statement needs to discuss bison habitat and forage outside the park, historical use of habitat by bison, and the significance of access to that habitat by the herd.

Response: In this volume "Bison: Vegetation/Vegetative Communities" (issue 1A) addresses the forage availability in areas outside Yellowstone National Park. Responses concerning the bison population (see "Bison: Population") address the importance of habitat beyond park boundaries.

Representative Comment: 15420AA

Issue 12: ***Unknowns and Assumptions***

A Comment: The environmental impact statement says there are many unknowns and assumptions. How can the public comment on tools being proposed when the preferred alternative relies on unknowns and assumptions?

Response: The environmental impact statement tries to examine the range of possibilities, because in reality there are unknowns and assumptions in this planning process. Each alternative includes a phase 1, where no changes over existing management need take place; and a phase 2, which assumes all changes have been made. As each element of phase 2 of the selected alternative becomes available, it would be used. This is why the alternatives are structured so as to examine incremental increases away from bison management and toward cattle management, or vice versa. This way the public knows how each tool, technique, or choice would affect relevant resources. As an example, if the state veterinarian refuses to establish areas outside Yellowstone National Park where bison are tolerated (SMAs), the impacts as described in phase 1 of alternative 5 would apply. If vaccination was adopted, but SMAs not approved, phase 1 of alternative 6 would apply. If bison were allowed outside the park as they are now, but no formal SMA designated, alternative 1 would apply. If these conditions existed and a quarantine was approved, impacts of alternative 4 would be relevant. Although we understand and agree it is difficult to comment on unknowns, the environmental impact statement has captured the range of possibilities, and commenters need to read and comment on the entire document to understand that range.

Representative Comment: 15366PP

B Comment: CEQ regulations at 40 CFR 1502.22 impose three obligations in the face of uncertainty: (1) disclose the scientific uncertainty; (2) complete independent research and gather information if no adequate info exists (unless exorbitant); (3) evaluate potential, reasonably foreseeable impacts in absence of relevant information, using a four-step process. The environmental impact statement does not do this for risk and should.

Response: The scientific uncertainty is disclosed in detail in this volume under the topic "Bison: Brucellosis Risk Management," and "Bison: Brucellosis Transmission and Public Perception." To summarize, the risk of transmission cannot be quantified because important information is lacking, and because the risk is so small it cannot be accurately measured (NAS 1998). Although research is ongoing to determine the epidemiology and pathology of brucellosis in bison, it is likely that even this information would not be enough to allow agencies to quantify risk, because it is small. Even if the agencies could quantify risk, it is likely that bison and cattle would not be allowed to commingle. Instead, the agencies manage risk by ensuring temporal and spatial separation between susceptible cattle and bison or potentially infectious birth materials or other exudates. It is unlikely that quantifying risk would change bison management at all. The final environmental impact statement provides a qualitative analysis of risk based on economic and other factors; see volume 1, "Environmental Consequences: Impacts on Socioeconomics."

Representative Comment: 13464AA

C Comment: Given the state vet authority, what happens if SMAs are not approved after the record of decision is signed? The environmental impact statement can't determine impacts, and the public cannot debate the issue if Montana retains after the fact authority to change decisions.

Response: Please see response 1A above. The environmental impact statement tries to capture impacts of the range of possibilities because of the many unknowns. To directly answer this specific question, if SMAs were not approved or if management zones as described in the modified preferred alternative were not included in the final decision, the impacts of the *Interim Bison Management Plan*, as described in this environmental impact statement (alternative 1) would apply. If bison were kept inside the park, the impacts of phase 1 of alternative 5 would be applicable.

Representative Comment: 14775E, 15329

Issue 13: ***Connected Actions and Cumulative Impacts***

A Comment: The natural processes before Europeans arrived included harvest of bison by Native Americans, so this may be part of natural regulation in the park.

Response: "Harvest" in the form of hunting, slaughter, and shooting, or transfer to quarantine, is part of several alternatives.

Representative Comment: 14305G

B Comment: Connected actions, cumulative impacts include prairie dogs (candidate for listing), impacts of current cattle grazing and reduction of bison interplay — impact of wolves' food. Environmental impact statement not informed exercise of discretion, or hard look at impacts (*Marsh vs. ONRC* 1989). Using it to make a decision would make that decision arbitrary and capricious.

Response: No prairie dogs exist in the impact area. The Yellowstone National Park bison herd consists primarily of mountain bison, rather than plains bison. There is a great deal of information in the environmental impact statement on the impact of bison reductions on grizzly bears and wolves and a biological assessment has been prepared (see volume 1, "Environmental Consequences: Impacts on Threatened, Endangered and Sensitive Species"). We are not sure how to interpret your third comment (interplay between cattle grazing and reduction of bison), but believe you are indicating that cattle grazing in the impact area is responsible for a reduction in the distribution and numbers of bison. This may be true, but the problem before the agencies right now is the control of the spread of brucellosis from bison, which have the disease, to cattle, which currently do not, in Montana. In other words, it is outside the scope of this environmental impact statement to analyze the impact of cattle grazing on the size and distribution of the bison population.

Representative Comment: 14540P

Issue 14: ***Corrections***

A Comment: Define zoonotic, stochastic, seroprevalence, etc.

Response: Zoonotic means a disease can be transferred from animals to humans. Stochastic means random. Seroprevalence means the animal tests positive for antibodies to *Brucella* (i.e., it has likely been exposed to or had brucellosis).

Representative Comment: 581H

B Comment: Meyer 1992 was not a report by the department at Davis, but was Meyer's report as a consultant to Yellowstone National Park 1995. The publication date was 1997 and is coauthored. Suggest entire EIS be referenced more carefully.

Response: The agencies have updated the final environmental impact statement to include a more careful check of references.

Representative Comment: 5654C

C Comment: Explain why shared costs are presented in alternatives 2, 3, and 7, but not in others (p. 29, table 1).

Response: Shared costs are part of these alternatives because each includes land acquisition for winter range.

Representative Comment: 214G

Bison Effects on Free-Ranging Status and Distribution (NE-9)

Issue 1: ***Not a Full Range of Alternatives***

A Comment: Maintaining a wild, free-ranging bison population was not presented in any of the alternatives.

Response: The cooperating agencies developed a wide range of reasonable alternatives to address the purpose of the plan, meet one or more of nine objectives, and comply with legal and regulatory mandates of each agency (see volume 1, "Purpose of and Need for Action: Objectives and Constraints — Constraints in Taking Action (Legal and Policy Mandates)." The agencies defined a wild, free-ranging population of bison as "one that is not routinely handled by humans and can move without restrictions within specific geographic areas." Each alternative identifies areas where bison would be allowed to move (defined as SMAs or management zones) and operating capture facilities were not found to significantly affect the free-ranging character of the population. Alternative 2 would provide the largest area where bison would be allowed to move with minimal agency management and lethal control. Alternative 5 would restrict bison movement to within Yellowstone National Park and would authorize significant management activities within the park (capture, testing, slaughter of bison, and agency shooting).

Representative Comment: 2122B

Brucellosis Transmission and Public Perception (NE-24)

Issue 1: ***Missing Critical Scientific Detail***

A Comment: There are no data to show that brucellosis has recurred in Montana's cattle herds.

Response: Montana has remained brucellosis class-free since 1985. As a class-free state, Montana must prepare an annual report summarizing its brucellosis program activities for the previous 12 months, including data such as cattle numbers and statistics relating to surveillance testing. Surveillance of cattle in Montana since 1985 has not disclosed any brucellosis-infected herds in Montana.

Representative Comment: 14819F

B Comment: There are no data documenting any bison abortions inside or outside the park.

Response: Following are four cases of abortion in bison — three from Yellowstone National Park, one from Teton County, Wyoming. References are provided.

In March 1992 a near-term aborted bison fetus was collected near Old Faithful geyser in Yellowstone National Park. *Brucella abortus* biovar 1 was isolated from the fetal abomasal contents, lung, and heart blood. (Rhyan et al. 1994)

In March 1989 a recent abortion was diagnosed in a female bison from Teton County, Wyoming. *B. abortus* biovar 1 was isolated from vaginal discharge, uterine contents, uterus, and supramammary lymph nodes. (Williams et al. 1993)

In April 1996, a near-term aborted fetus and placenta were found in Yellowstone National Park, near Gardiner, Montana. *Brucella abortus* was isolated from 15 sites of the fetus and placenta. (Rhyan et al. 1998)

In March 1995, a recent abortion and retained placenta was diagnosed in a female bison from Yellowstone National Park, near Gardiner, Montana. *Brucella abortus* was isolated from 15 sites including the placenta and feces. (Rhyan et al. 1998).

Representative Comment: 14819F

C Comment: There are no admissions regarding the lack of correlation between brucellosis blood tests in bison and positive tissue culture results for those same bison.

Response: While there is not 100% correlation between brucellosis blood tests and positive cultures, there is some degree of correlation, similar to a chronically infected bovine herd. In a study of serology and infection in Yellowstone bison, 11 of 27 seropositive adult female bison were culture positive. All 11 had high quantitative titers. See this volume, "Bison: Brucellosis Transmission and Public Perception" and "Bison: Brucellosis Testing" for more information (Roffe et al. 1999).

Representative Comment: 14819F

D Comment: The 1998 NAS report should be included in the final environmental impact statement in its entirety.

Response: The NAS report is publicly available. Relevant sections of the report have been used in responding to comments and updating the text of the environmental impact statement.

Representative Comment: 14980E

E Comment: The final environmental impact statement must list the scientific criteria that will be used to guide future decisions.

Response: The criteria used to guide future decisions may include the following:

Bison Population Range
- herd sex and age ratios
- carrying capacity inside and outside the park
- genetic variation
- impact on other species

Capture/test/slaughter
- changes in land use
- changes in regulations
- changes in policies
- social tolerance
- cost
- herd sex and age ratios
- seroprevalence
- population size
- changes in cattle operations

Quarantine
- changes in regulations
- changes in policies
- cost
- population size
- seroconversion rate
- numbers of bison in and out of the facility

Monitoring Bison
- distribution
- land use and ownership
- population size
- weather

Bison Hunting
- population size
- social values
- changes in regulations
- changes in policies
- land use and ownership
- treaty rights
- population sex and age
- economics

Bison Management on Public Lands
- seroprevalence
- social values
- price of beef
- allotment permits
- current policies and regulations
- bison population size
- land use planning
- risk to cattle

Bison Management on Private Lands
- same as for public lands
- plus private property damage

Surveillance Testing of Cattle
- bison distribution
- cattle operations
- land use
- changes in regulations
- changes in policies
- improved cattle testing
- vaccine efficiency (improved cattle vaccine)
- bison vaccination
- eradication of brucellosis from the Greater Yellowstone Area
- state brucellosis status
- elk distribution

Vaccination of Cattle with RB51
- bison distribution
- cattle operations
- land use
- changes in regulations
- changes in policies
- vaccine efficiency (improved cattle vaccine)
- bison vaccination
- eradication of brucellosis from the Greater Yellowstone Area
- elk distribution

Vaccination of Bison
- proven safety in target and nontarget species
- proven efficacy
- bison distribution
- delivery system
- eradication of brucellosis from the Greater Yellowstone Area
- percent of herd vaccinated

National Forest Grazing Allotments
- same as for "Bison Management on Public Lands" above

Winter Road Grooming
- bison distribution
- bison population size
- eradication of brucellosis from the Greater Yellowstone Area
- changes in Yellowstone National Park policies

Cost Effectiveness
- applies to all topics above.

Representative Comment: 14819F

Objectives and constraints

New Alternatives/Issues (OC-4)

Issue 1: ***Objectives for the Plan***

A Comment: Any plan should be based on and supported by science, not fear or politics.

Response: The National Environmental Policy Act binds federal agency decision makers to make informed decisions, but it does not dictate the factors that weigh most heavily in their decision-making process. Although public comments and public opinion are often among those factors, the primary purpose of soliciting comments and concerns on a *Draft Environmental Impact Statement* is to help agency staff add all needed information and corrections so that the final environmental impact statement is as accurate and informative as possible. This document is then used as part of the record available to and considered by agencies in making their final decision.

Representative Comment: 10414D

B Comment: Use sensible, humane, and scientifically credible criteria for any plan.

Response: The criteria used by the agencies in drafting a set of reasonable alternatives were mutually agreed upon by the agency decision makers before the analysis began. Since each agency has specific mandates, and since relatively little overlap in these mandates exists, agreeing to criteria that were used to determine whether alternatives were reasonable, or for selecting the preferred alternative for implementation, were important. These criteria (objectives) are found in volume 1, "Purpose of and Need for Action: "Objectives and Constraints." The agency mandates (constraints) are described under "Constraints in Taking Action." Because the criteria are based on requirements each agency must fulfill, we believe they are sensible. Because they include provisions for maintaining a wild and free-ranging population of bison, and because the agencies agree humane treatment of bison is important (see volume 1, "The Alternatives: Actions Common to All Alternative —Humane Treatment of Bison"), we believe the alternatives are humane. Also, because objective 8 requires each alternative to be based on factual information, we believe the plans are scientifically credible. Updated information has been added where appropriate in the final environmental impact statement.

Representative Comment: 331A

C Comment: Adopt a plan that preserves the herd as truly wild.

Response: The interagency team has defined a wild and free-ranging population as one that is not routinely handled by humans and can move without restrictions within specific geographic areas (see volume 1, "Purpose of and Need for Action: Objectives and Constraints"). Each alternative meets this objective to some degree through the maintenance of the herd inside Yellowstone National Park, where no human handling or intervention takes place. The percentage of the herd leaving the park in most years is small; therefore, the majority of the herd is truly wild by this definition.

Representative Comment: 5161A

D Comment: Because APHIS has said any of the alternatives would be sufficient to prevent an outbreak, there is no need to have objectives 5 or 6. The size of the herd is covered under objectives 1, 2, and 7.

Response: The objectives were developed through a six-year ongoing planning effort. As noted above, the agencies involved in brucellosis and bison management have widely differing mandates, so agreement on management principles was important. The agencies believe all nine objectives are important in guiding the selection of a bison management plan.

Representative Comment: 918D

E Comment: Objective 2 is unnecessary because only 2% is privately owned.

Response: Note response to issue 1D above. All objectives are considered important by the agencies charged with managing brucellosis in bison, including objective 2.

Representative Comment: 14700E

F Comment: The suggestion in the environmental impact statement that objective 1 addresses public concerns is not true. The concern is not about how many bison there are, but that there be minimal human intervention and bison be managed by natural processes in an undisturbed setting.

Response: The first objective, "address bison population size and distribution; have specific commitments relating to the size of the bison herd," does not just address a maximum herd size but a minimum as well. This would ensure a genetically and ecologically viable wild herd, even if a very harsh winter forces a larger percentage of bison outside the Yellowstone National Park boundaries. While we understand the primary thrust of the request by organizations was that bison should not be managed at all, the agencies have agreed that bison management would emphasize minimal human intervention inside the park in all alternatives except certain phases of 5 and 6. This was considered reasonable by all of the agencies, and it fulfills the requirement for a wild and free-ranging population. See "Alternatives: New Alternatives/Issues — Issue 8" for a response to the comment that bison should remain altogether free of human intervention.

Representative Comment: 15420N

G Comment: The discussion should not be framed as to how to keep bison from infecting cattle, but rather how to conserve and restore bison, and eliminate or overcome obstacles to that goal.

Response: Bison are not an endangered or threatened species. However, the Yellowstone herd is unique in that it is one of only a few wild and free-ranging populations of bison in the country, and this aspect of the herd is something the agencies believe needs to be preserved. This is the reason the purpose statement includes a mandate "to maintain a wild, free-ranging population of bison."

Representative Comment: 1303B

H Comment: The agencies should hold to the greater vision the original framers and legislators had for Yellowstone National Park and surrounding lands.

Response: We believe the alternatives proposed in the plan do hold to this vision. Many of the policy statements for the National Park Service, as well as those guiding the original creation of the park, are described on pp. 31–32 of the *Draft Environmental Impact Statement*. These include provisions for retaining "wonders within said park" in their natural condition; prohibiting the destruction of fish and game in the park "for the purposes of merchandise or profit," and requiring all parks to "conserve the… wildlife in parks and to provide for the enjoyment of the same… as will leave them unimpaired for the enjoyment of future generations." We believe all alternatives are consistent with these policy statements.

Representative Comment: 2082G

Issue 2: *Eradication of Brucellosis*

A Comment: Alternatives 5 and 6 attempt to eliminate the disease from bison. This is not an objective of this environmental impact statement, and these alternatives should be dropped.

Response: The purpose of action is two-fold: to maintain a wild and free-ranging population of bison, and to address the risk of brucellosis transmission by bison in order to protect the economic interest and viability of the Montana livestock industry. Each alternative considered does both, although in varying degrees. Alternatives 5 and 6 emphasize addressing risk, and do so solely through the management of the

bison herd. They would affect the bison herd's wild and free-ranging nature, but they would do so for a maximum of three years, and so were acceptable to the agencies. They are, however, at one end of the spectrum of reasonable alternatives (see this volume, "NEPA: New Alternatives and Issues – Issue 6" for more information on the range of alternatives requirements imposed by the National Environmental Policy Act).

Representative Comment: 15420QI

B Comment: The elimination of brucellosis is unrealistic given the presence of elk. It also sets a dangerous precedent for brucellosis management in other species.

Response: See "Wildlife: Brucellosis in Other Wild Ungulates" in this volume and volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison" for more information on brucellosis in other wildlife and differences in transmissibility from these species to cattle.

Representative Comment: 5455C

C Comment: The alternatives are inadequate to eradicate brucellosis.

Response: Yes, they are. Elimination of brucellosis in bison is not an objective of this plan as noted in the *Draft Environmental Impact Statement* (see p. 29).

Representative Comment: 9000E

D Comment: Any plan must initiate immediate control of brucellosis in bison and clearly lay out a plan for eradication of brucellosis from Yellowstone National Park bison.

Response: The purpose of the bison management plan is two-fold: to maintain a wild and free-ranging population of bison, and to address the risk of brucellosis transmission by bison in order to protect the economic interest and viability of the Montana livestock industry. The purpose is not solely to control brucellosis in bison, but rather to manage its transmission between bison and Montana cattle while still maintaining the wild, free-ranging nature of the herd.

Representative Comment: 9364N

E Comment: The fatal flaw in this environmental impact statement is its commitment to the eventual elimination of brucellosis in wildlife. That is not within the scope of this environmental impact statement, but is used to evaluate whether alternatives are reasonable. It should be eliminated as an objective.

Response: The agencies believe that commitment toward the eventual elimination of brucellosis from the Greater Yellowstone Area wildlife population is an important objective. However, it is not the intent of the bison management plan to eliminate the disease, even in bison, and this was not used to evaluate alternatives. At this time the elimination of brucellosis in bison would require intensive management of all Greater Yellowstone Area wildlife infected with the disease. This is inconsistent with NPS *Management Policies* of natural regulation and is not under consideration as an option.

Representative Comment: 14980H

Issue 3: ***Illegal or Indefensible EIS Objectives***

A Comment: The environmental impact statement has used arbitrary and illegal criteria to eliminate alternatives including the no action. They must also be subject to public review before they are adopted.

Response: Agencies are well within their rights to determine the purpose in taking action and are not required to obtain public review before this step is taken. The public review is one of the means to

accomplish the purpose of action, e.g., the alternatives. In this case, the objectives are agreed-on statements of purpose consistent with the agencies given the responsibility to manage brucellosis in bison. These agencies have divergent mandates, and the purpose and objectives are areas where these mandates "intersect" or overlap. So, although they may seem arbitrary, in fact these statements were systematically developed by the agencies over a six-year process.

The objectives did not result in the elimination of no action. As defined by the Council on Environmental Quality, the no-action alternative is the continuation of the present course of action, i.e., the *Interim Bison Management Plan*.

Representative Comment: 14714W

B Comment: Several of the objectives are not defensible and are not in the interest of the bison herd, especially those that require boundaries, commit to a bison herd size, protect cattle from brucellosis, and commit to the elimination of brucellosis. All require human-inflicted mortality.

Response: The purpose of action is not just to maintain a wild, free-ranging population of bison, but also to address the risk of brucellosis transmission to cattle. Although the objectives mentioned may not emphasize the "wild and free-ranging" portion of the purpose statement, the agencies believe the objectives are needed to fulfill the second part of that statement. As noted above, it is up to the agencies charged with bison management to determine the purpose of taking action, and the constraints that agency mandates or other factors impose on the reasonableness of management actions proposed in each alternative.

Representative Comment: 14700D

Legal and Policy Mandates — Management Authority (OC-32)

Issue 1: ***Montana Board of Livestock Authority***

A Comment: Should the Board of Livestock have the authority to implement the bison management plan, including the determination of whether bison should freely roam outside Yellowstone National Park, the definition of low-risk bison, and the determination of which animals to ship to slaughter? The Supreme Court has found that control and ownership of wildlife animals is held in public trust by the states and that APHIS has no jurisdiction over wildlife. Likewise, the Montana Department of Livestock is precluded from the same authority.

Response: The state of Montana was a joint-lead participant in the development of a bison management plan and environmental impact statement (see volume 1, appendix C). As a state agency, the Montana Department of Livestock is authorized by Montana statute to regulate animal health, including specific responsibilities related to the management of bison that migrate from the park into Montana because that herd is affected with brucellosis. The authorities of the Board of Livestock and the Department of Livestock, as well as the authorities of the other cooperating agencies, are described in volume 1, appendix E of the final environmental impact statement. The state would have discretion as to which of its agencies would implement bison management outside of the park. The authority of APHIS is based on its authority to manage livestock diseases and not on a claim of "jurisdiction" over wildlife.

Representative Comment: 2D, 14356K

B Comment: The Montana state veterinarian should be responsible to determine which bison may be tolerated and when bison should be removed or returned to the park because SMAs would increase the risk of brucellosis transmission from bison to cattle.

Response: The final plan, consistent with the record of decision, will specify locations of SMAs, which and how many bison may occupy SMAs, and the circumstances that would require removal of bison from the SMAs. These decisions will consider the responsibility of the Montana state veterinarian to manage the risk of brucellosis.

Representative Comment: 15246A

C Comment: The preferred alternative leaves too many management decisions for later and puts them into the hands of the Montana Department of Livestock. This violates NEPA procedures.

Response: The environmental impact statement is both programmatic and site-specific in the analysis of various components in the alternatives. Both the preferred alternative in the *Draft Environmental Impact Statement* and the modified preferred alternative in this final document include a phased approach to bison management. Some steps may require subsequent NEPA/MEPA analysis, tiered to this environmental impact statement, before the agencies could implement certain aspects of the alternative.

Representative Comment: 15329E

D Comment: The Board of Livestock is attempting to circumvent the NEPA/MEPA decisions.

Response: The federal agencies anticipate that Board of Livestock actions regarding bison management will be made and implemented in accordance with this environmental impact statement. However, the agencies also recognize the state may choose to implement another plan, which would need to be supported by additional National Environmental Policy Act/Montana Environmental Policy Act analysis.

Representative Comment: 15420OB

E Comment: The Montana Department of Livestock requested the 1995 Montana Legislature to grant it authority for bison management, following threats of sanctions by other states. They maintain that those threats were instigated by Montana officials .

Response: The comment is correct in noting that the 1995 legislature assigned primary responsibility to the Department of Livestock for the management of bison that emigrate from Yellowstone National Park into Montana. The federal agencies do not know all of the circumstances leading to this change.

Representative Comment: 15420V

F Comment: Commenters request clarification of the Montana Department of Livestock's current authority or what new authorities would be necessary to require vaccination of cattle on lands around Yellowstone National Park. They note that the department may not have the authority to require vaccination of animals that remain on the owners' premises, but that would not preclude the department from requiring vaccination of bison that graze on public lands. The state of Montana should require cattle vaccination in the Greater Yellowstone Area, because vaccination is the most workable method of reducing the risk of brucellosis transmission from bison to cattle.

Response: As noted elsewhere, cattle producers in the analysis area, including those who graze cattle on public lands, already voluntarily vaccinate their cattle. The modified preferred alternative in the final environmental impact statement provides for vaccination of all eligible cattle in the affected area through reimbursement from APHIS to the cattle producers for the costs of administering the vaccine. The federal agencies are encouraging the state to take measures to ensure that all cattle in the affected area are vaccinated.

Representative Comment: 15420NB, 14819KK

G Comment: There are statements throughout the *Draft Environmental Impact Statement* that the creation of an SMA would require approval of the state of Montana as specified by Montana law. This statement needs to be clarified. The Department of Livestock has authority to protect Montana's livestock interests, but does the state have authority for additional approvals beyond the state's approval of the record of decision?

Response: According to information provided by the state, SMAs would be approved in accordance with the Board of Livestock's responsibility and authority for the control of disease and the protection of the livestock industry from disease (M.C.A. §§ 81-2-102 and 81-2-103); authority to appoint the state veterinarian (M.C.A. §81-1-301); authority to manage wild bison for disease control (M.C.A. §81-2-120); and, the Department of Livestock's regulatory authority for the administration of the control of bison that emigrate from Yellowstone National Park (A.R.M. §32.3.224). The federal agencies acknowledge that the full implementation of the final plan likely will rely on the cooperation of the state of Montana in tolerating bison outside the park. The federal agencies believe the features of the various alternatives will protect Montana's class-free status so that the state should tolerate bison outside the park. Because some alternatives anticipate the acquisition of land or alterations of management regimes, additional NEPA/MEPA requirements may have to be met before those features can be implemented on a site-specific basis.

Representative Comment: 15420SB

H Comment: Ranchers should not be allowed to slaughter bison.

Response: The authority and process for removing bison from private land were described in the *Draft Environmental Impact Statement* (see p. 58).

Representative Comment: 16624A

I Comment: Should the Board of Livestock have absolute authority for the management of bison? The National Park Service should not have granted absolute authority to the Board of Livestock.

Response: Fundamental to this environmental impact statement is the recognition that the Yellowstone National Park bison herd is not restricted to one jurisdiction. Each cooperating agency has some authority for certain aspects of bison management. None has absolute authority, and none of the agencies has relinquished any of its authority to any of the other agencies.

The Montana Board of Livestock has authority under state law to manage bison that enter Montana from Yellowstone National Park. The National Park Service did not grant this authority to the board. The authority is the product of Montana's statutory law and constitutional law.

Representative Comment: 1849A

J Comment: The Board of Livestock should have nothing to do with the bison management plan.

Response: The Board of Livestock's authority for bison management is established in Montana law. Those authorities were explained in the *Draft Environmental Impact Statement* (appendix E, pp. 361–363).

In general, the Board of Livestock has authority for the control of disease and the protection of the livestock industry from disease (M.C.A. §§ 81-2-102 and 81-2-103). The board also must appoint an administrator of the laws relating to animal health, i.e., the state veterinarian (M.C.A. §81-1-301).

It is under this broad statutory authority that numerous disease control programs are conducted and regulated by the Board of Livestock. In addition, under the board's authority the Department of Livestock promulgates rules and orders necessary and proper to protect the livestock industry from disease. A variety of disease control programs and actions occur under this statutory authority, including the administration of A.R.M. §32.3.224A regarding the control of bison that emigrate from Yellowstone National Park into Montana. Historically, bison control actions have been conducted under this authority.

In 1995 the Montana legislature passed legislation that assigned additional bison management responsibilities to the Department of Livestock (M.C.A. §81-2-120). The department has the authority to adopt rules regarding the management of bison that originate from diseased herds (e.g., Yellowstone National Park).

Representative Comment: 14614F

K Comment: Commenters questioned whether the Board of Livestock should have the authority to implement the bison management plan because its members are ranchers. They have a vested interest, and their participation in bison management is a conflict of interest.

Response: The authorities of the Montana Board of Livestock, including its authority regarding Yellowstone National Park bison, are defined by Montana law (DEIS, appendix E, pp. 361–363). The composition of the Board of Livestock also is governed by state law (M.C.A. §2-15-3102), and the board is the head of the Department of Livestock (M.C.A. §2-15-3101). By state law, each member of the Montana Board of Livestock must be a resident of the state and be an active livestock producer. The federal agencies believe that any bias resulting from this requirement is balanced by the conservation backgrounds and mandates of other agencies involved with the management of the Yellowstone bison herd.

Representative Comment: 98A

L Comment: The preferred alternative gives too much say over wildlife management on public lands to the livestock lobby and too little responsibility to mitigate the risk of transmission to the livestock industry.

Response: Under Montana law, the Montana Board of Livestock and the Department of Livestock, not the livestock lobby, have authority to manage bison that emigrate from Yellowstone National Park into Montana.

Permittees who operate on public lands adjacent to the park will do so under grazing permits that accommodate the bison management plan, but the state may also take actions it believes are necessary to protect livestock.

Representative Comment: 2389A

M Comment: The Board of Livestock should have no absolute authority over public lands that belong to the citizens of the United States.

Response: The Board of Livestock has no authority over the management of public lands adjacent to Yellowstone National Park. However, the Montana Legislature has through statute assigned specific responsibilities to the board and the Department of Livestock for the management of bison that migrate from Yellowstone National Park into Montana. The U.S. Forest Service and the Montana Department of Livestock coordinate activities that occur on federal lands outside the park.

Representative Comment: 16551D

N Comment: To whom is the Board of Livestock accountable, or is the Board accountable to any elected official?

Response: By statute (M.C.A. §2-15-3102), the Board of Livestock is appointed by the governor of Montana, and member appointments are confirmed by the Montana Senate. The governor designates the board's presiding officer. The Montana Legislature may amend the statutory authority of the Board of Livestock. Pursuant to state statutes governing disease management of bison, the governor has the authority to approve the final bison management plan.

Representative Comment: 425A

O Comment: Granting authority for bison management to the Board of Livestock would set a precedent for the management of other wildlife species that are inconvenient to the ranching industry.

Response: The Montana Legislature assigned specific responsibilities to the Board of Livestock and the Department of Livestock for the management of bison that migrate from Yellowstone National Park into Montana, because this herd is affected with brucellosis. The Board of Livestock has specific authorities and responsibilities for participation in the national brucellosis eradication program, a national program that is administered by federal and state animal health officials. Future Montana legislative actions regarding other wildlife species are too speculative to be addressed in the environmental impact statement.

Representative Comment: 6107C

P Comment: Montana should endorse the APHIS definition of "low-risk" bison.

Response: The federal agencies will continue to work with Montana toward the goal of additional tolerance of bison, under certain spatial and temporal conditions as defined in the modified preferred alternative in the final environmental impact statement.

Representative Comment: 8402AE

Q Comment: Is Montana's "zero-tolerance" policy necessary?

Response: According to the state of Montana, it does not have a "zero-tolerance" policy for bison. The federal agencies assume that under certain defined conditions and criteria, bison would be tolerated by the state outside of Yellowstone National Park.

Representative Comment: 8613A

R Comment: Montana's insistence on a zero-risk policy threatens the livestock industry because it draws attention to brucellosis-infected wildlife. Montana should adopt a policy of risk management.

Response: According to the state of Montana, animal health officials are aware of brucellosis-infected wildlife because, with significant progress toward eradication of brucellosis from the nation's livestock industry, wildlife in the Greater Yellowstone Area are quickly becoming the last reservoir of the disease in this country. Montana's policies are a response to their awareness. Consistent with the purpose and need of this environmental impact statement, the long-term bison management plan will emphasize a reduction in the risk of brucellosis transmission from bison to domestic livestock.

Representative Comment: 15671CC

S Comment: The *Draft Environmental Impact Statement* indicates that all alternatives are legally implementable. However, some alternatives are not legally implementable because the Department of Livestock has authority to regulate estrayed animals, including bison, and the Department's regulations require the removal of publicly owned bison originating from a herd infected with a dangerous disease that may spread to persons or livestock or jeopardize Montana's compliance with other state or federally administered livestock disease control programs.

Response: According to the state of Montana, the environmental impact statement does not require the Department of Livestock to relinquish its authority to regulate estrayed animals. The Department of Livestock is required to take action when bison emigrate from Yellowstone National Park into Montana (A.R.M. §32.3.224).

Representative Comment: 9364M

T Comment: Current laws and regulations prohibit the Montana state veterinarian from allowing brucellosis-infected and exposed bison unrestricted access to the SMAs within the state.

Response: The environmental impact statement does not propose to allow brucellosis-infected and exposed bison unrestricted access to the SMAs within the state. Under state law, the Department of Livestock must take action when bison emigrate from Yellowstone National Park into Montana (A.R.M. §32.3.224). This authority does not require the Board to kill or otherwise remove all bison leaving the park

Representative Comment: 9364U

U Comment: The Department of Livestock would have to amend its regulations to implement alternative 2 because this alternative allows untested bison to occupy large areas beyond the park boundary.

Response: The Department of Livestock is required to take action when bison emigrate from Yellowstone National Park into Montana (A.R.M. §32.3.224). Alternative 2 features control actions within the Board's authority.

Representative Comment: 14816G

V Comment: The Department of Livestock would have to amend its regulations to adopt the new definition of "low-risk" bison proposed in the DEIS and to permit those animals to enter the state.

Response: According to the state, the Montana statutes consider bison that migrate from Yellowstone National Park into Montana to be bison that originate "from a herd that is infected with a dangerous disease," without any distinction for "low-risk" animals. The Department of Livestock is required to take action when bison emigrate from Yellowstone National Park into Montana (A.R.M. §32.3.224). The state of Montana has stated that it would not need to amend any regulations to implement the low-risk definition. The level of risk, whether it is low or high, informs the severity of action the board may need to take to control bison, without the need for regulatory change. The federal agencies will continue to work with the state toward the goal of accepting bison outside of the park, under certain temporal and spatial conditions and criteria, as defined in the modified preferred alternative in the final environmental impact statement.

Representative Comment: 14816G

W Comment: Bison that enter Montana from Yellowstone National Park are under the authority of the Montana Department of Livestock because these animals originate from a herd that is infected with brucellosis.

Response: Bison that enter Montana from the park are under the authority of the Montana Department of Livestock because that authority is assigned to the agency by Montana law. The Montana statutes consider bison that migrate from Yellowstone National Park into Montana to be bison that originate "from a herd that is infected with a dangerous disease."

Representative Comment: 10638P

X Comment: Some of the alternatives represent an unfunded federal mandate for disease management and bison population control on the state of Montana.

Response: The cooperative bison management program is not an unfunded mandate. The state and federal agencies each have limited jurisdiction to manage wildlife, including bison. The National Park Service jurisdiction ends at the boundaries of the park. The Forest Service leaves most wildlife management to the states. Most states, including Montana, assert their authority to manage wildlife on national forest system lands. Additionally, the federal agencies have contributed, and will continue to contribute, substantial funds for the cooperating bison management program.

Representative Comment: 11121L

Y Comment: The U.S. Environmental Protection Agency suggests that the establishment of SMAs should be determined by the state and federal decision makers rather than at the discretion of the Montana Board of Livestock.

Response: The establishment of SMAs would require the cooperation of the state and federal agencies with responsibility for bison management under both state and federal law. According to the state, in order to ensure the marketability of Montana cattle, the Montana state veterinarian must retain the discretion to exercise sound professional judgment in response to specific situations. The federal agencies believe many of the alternatives in the environmental impact statement preserve the state veterinarian's discretion to react in specific situations while best maintaining a wild, free-roaming herd of bison.

Representative Comment: 14356K

Z Comment: The U.S. Environmental Protection Agency questions the discretionary authority of the state veterinarian to determine the length of time between 30 and 60 days prior to the return of cattle to the west boundary area that bison must be hazed back into Yellowstone National Park or shot. The agency suggests

that the National Park Service should play a substantive role in this decision. The required time separation between bison and cattle should be established in the environmental impact statement rather than leaving the exact number of days to the discretion of the Montana state veterinarian.

Response: The federal agencies continue to evaluate this issue, relying on new research and evaluating existing knowledge. The modified preferred alternative proposes an adaptive management approach in increased tolerance of bison outside of the park under specific criteria and conditions. All EIS alternatives acknowledge the importance of cooperation between the parties in implementing the plan, including active participation of the National Park Service and the state.

Representative Comment: 14356E, 15420EE

AA Comment: Yellowstone National Park's mandate prohibits the capture or destruction of the park's fish and wildlife for merchandise or profit. The *Draft Environmental Impact Statement* allows for the sale of meat, heads, and hides from slaughtered bison. The funds are retained by the Montana Department of Livestock and may constitute a profit.

Response: According to the state, as specified by Montana statute, funds derived from the sale of bison meat, heads and hides have been used to offset agencies' costs for bison management. However, the data regarding revenues has not been provided.

Representative Comment: 14714HH

Issue 2: ***Montana Fish, Wildlife and Parks Authority***

A Comment: Professional wildlife managers, rather than the Montana Board of Livestock, should be in charge of bison management. Montana Fish, Wildlife and Parks should have jurisdiction for bison that leave the park.

Response: The Montana Legislature assigned primary responsibility to manage Yellowstone bison outside the park to the Department of Livestock. The Montana Legislature also has directed that the Department of Fish, Wildlife and Parks shall cooperate with the Department of Livestock, in accordance with a bison management plan approved by the governor. Further, both agencies are encouraged by statute to enter into an agreement with the National Park Service for the long-term management of bison.

Representative Comment: 148B

B Comment: Bison are wildlife and should be managed as such by the appropriate state and federal wildlife management agencies.

Response: The Montana Legislature has the responsibility to determine the appropriate roles of the Montana state agencies and has assigned roles for the management of bison to the Departments of Livestock and the Department of Fish, Wildlife and Parks.

Representative Comment: 1076B

C Comment: The Montana Department of Fish, Wildlife and Parks should not have to pay to remove bison from its land.

Response: Montana regulations (M.C.A. §87-1-216) direct the Department of Fish, Wildlife and Parks to cooperate in the management of bison that migrate from Yellowstone National Park into Montana. Except for a portion of the Gallatin Wildlife Management area, no wildlife management areas administered by Montana Fish, Wildlife and Parks are within the specified distribution of bison for any of the alternatives. It should be noted that bison have not used this area in the past.

Representative Comment: 9037A

D Comment: The *Draft Environmental Impact Statement* indicates that all alternatives are legally implementable. However, some alternatives are not legally implementable because Montana law does not allow for the sport hunting of bison.

Response: Approval of an alternative that includes public hunting would commit the agencies to petition the Montana Legislature to authorize public hunting. Pursuant to that authority, the Montana Fish, Wildlife and Parks Commission would promulgate regulations to implement the bison hunting season. That rule making would require a Montana Environmental Policy Act analysis, tiered to this environmental impact statement. In the event that the Montana Legislature decided to not authorize a bison hunting season, the agencies would make corresponding revisions to the bison management plan. Those revisions also might require additional NEPA/MEPA analysis, tiered to this environmental impact statement.

Representative Comment: 9364M

E Comment: Commenters requested clarification of the role of the Montana Department of Fish, Wildlife and Parks under any of the alternatives.

Response: The authorities of the cooperating agencies, including the Montana Department of Fish, Wildlife and Parks, is disclosed in appendix E of the *Draft Environmental Impact Statement*. The department has primary responsibility for damage to private property caused by bison. If authorized by the Montana Legislature, the department also would administer public hunting.

Representative Comment: 14980W

Issue 3: *State of Montana Authority*

A Comment: What authority did the Montana governor have in ordering the bison slaughter?

Response: According to the state, the Montana governor did not order the bison slaughter. The recent administrative history of bison management is summarized on p. 27 in the *Draft Environmental Impact Statement* including actions taken by the state under its interpretation of the *Interim Bison Management Plan*.

Representative Comment: 4836H

B Comment: Any final decision to allow bison on public lands outside Yellowstone, as verified by the governor's signature, should not be overruled or vetoed by the Montana state veterinarian.

Response: Bison management will proceed according to the preferred plan described in the final environmental impact statement as approved in record of decision. The federal agencies anticipate that the state will approve a bison management plan based on the final environmental impact statement or a separate Montana Environmental Policy Act document.

Representative Comment: 3363H

C Comment: There is nothing in the plan that guarantees the state of Montana will keep its obligations to cooperate in the management of SMAs, the issuance of special hunting permits, or the appropriation of money by the legislature.

Response: The federal agencies believe the state of Montana will take actions to support the mutual goals for reducing the risk of transmission of brucellosis and ensuring a free-roaming bison herd. Although this final environmental impact statement acknowledges cooperation in management is necessary when bison

move from one jurisdiction to another, the federal agencies cannot guarantee that Montana will continue to cooperate in bison management.

Representative Comment: 12025C

D Comment: Montana can seek remedies against other states that take action against Montana cattle under the interstate commerce clause of the Constitution.

Response: The federal agencies believe sanctions by other states aimed at cattle produced in Montana likely would run afoul of the commerce clause. Because all of the alternatives in this final environmental impact statement, as well as the modified preferred alternative in this final environmental impact statement, adequately address the risk of brucellosis transmission, sanctions from other states would discriminate against Montana's interests without serving the sanctioning state's legitimate local interests. Additionally, even if the sanctions would have only indirect effects on interstate commerce and regulate evenhandedly, they would still probably be contrary to the commerce clause because the burden on interstate commerce would clearly exceed the local benefits.

Representative Comment: 12050H

E Comment: All state decisions made subsequent to the final environmental impact statement should be open and include opportunity for public comment.

Response: According to the state of Montana, the Montana Constitution mandates a policy of open government. Decisions that require additional NEPA/MEPA analysis will include corresponding public notice and opportunity for public comment. The federal agencies believe the final environmental impact statement will provide the state a basis to make a decision implementing any alternative analyzed therein.

Representative Comment: 14846F

F Comment: Montana is a trustee of wildlife and has a fiduciary responsibility to protect wildlife species for the citizens of Montana. How does this responsibility coincides with the slaughter of bison?

Response: According to the state of Montana, the Montana Legislature, on behalf of the people of Montana, is the appropriate entity to define the state's responsibility for bison. In that capacity, the Montana Legislature has assigned specific responsibilities for the management of bison to the Departments of Livestock and Fish, Wildlife and Parks.

Representative Comment: 15363G

G Comment: Montana is required to comply with section 106 of the National Historic Preservation Act and to consult with the Indian tribes on a government-to-government basis because it has received federal funds for bison management.

Response: The government-to-government relationship is between the U.S. government and federally recognized tribes. States and tribes have a different relationship. States may choose to consult with tribes on a variety of issues, but such consultation is not required under federal law. The National Park Service has invited other federal agencies participating in the bison management planning effort, as well as the state, to all consultation sessions held with the tribes.

Representative Comment: 15386H

H Comment: Montana is required to recognize the distinct and unique cultural heritage of the American Indians, pursuant to article IX, section 4, and article X, section 1, of the Montana Constitution.

Response: According to the state of Montana, the full text of article IX, section 4, of the Montana Constitution follows:

> Section 4. Cultural resources. The legislature shall provide for the identification, acquisition, restoration, enhancement, preservation, and administration of scenic, historic, archeologic, scientific, cultural, and recreational areas, sites, records and objects, and for their use and enjoyment by the people.
>
> The full text of article X, section 1, of the Montana Constitution follows:
>
> Section 1. Educational goals and duties.
>
> (1) It is the goal of the people to establish a system of education which will develop the full educational potential of each person. Equality of educational opportunity is guaranteed to each person of the state.
>
> (2) The state recognizes the distinct and unique cultural heritage of the American Indians and is committed in its educational goals to the preservation of their cultural integrity.
>
> (3) The legislature shall provide a basic system of free quality public elementary and secondary schools. The legislature may provide such other educational institutions, public libraries, and educational programs as it deems desirable. It shall fund and distribute in an equitable manner to the school districts the states share of the cost of the basic elementary and secondary school system.

The state agencies do not agree that these sections of the Montana Constitution apply to bison management in the manner suggested by the commenters. The federal agencies defer to the state's interpretation of its constitution.

Representative Comment: 15368H

I Comment: The appendix should include the September 27, 1997, and November 13, 1997, letters from the federal agencies to Montana regarding changes in the 1996–97 interim plan and a low-risk policy.

Response: Appendix G includes memoranda from APHIS and from the Montana state veterinarian that describe the federal and state perspectives on changes to the definition of "low-risk" bison in the interim plan. The final environmental impact statement also includes in the appendix the correspondence sent to the governor regarding the modified preferred alternative, which includes provisions for additional tolerance of bison outside of the park under certain conditions and criteria.

Representative Comment: 15420

J Comment: The state of Montana has the same management authority and responsibility for bison as it does for elk.

Response: The agencies agree that the state of Montana has authority for wildlife, including bison and elk, that are resident within the state. The agencies also agree that the Montana Legislature is the entity with the authority to assign specific responsibilities for the management of resident wildlife to agencies of Montana state government. The agencies also recognize that bison and elk are different species, that the purpose and need for bison management is different from the purpose and need for elk management, and correspondingly, that the management objectives for each species are different.

Representative Comment: 17714A

Issue 4: ***Montana Legislature Authority***

A Comment: There is a difference between providing live, excess bison to other government entities, including tribal governments, and providing or selling publicly owned bison to individuals and businesses for commercial purposes. Privatization and selling of bison was amended into the Department of Livestock's authority by the 1997 legislature without public notice or hearing.

Response: The federal agencies anticipate that the distribution of live bison will follow procedures outlined in a future NEPA process if quarantine is part of the alternative selected in the current planning process. These procedures will be consistent with federal and state law.

Representative Comment: 15420W

Issue 5: ***National Park Service Authority***

A Comment: The National Park Service should have the ability to act on behalf of the interest of Yellowstone National Park without pressure from the U.S. Department of Agriculture.

Response: The National Park Service has sole authority for the management of bison while bison are within Yellowstone National Park and the ability to influence, to some degree, decisions on the management of bison outside park boundaries. NPS policies and laws provide authority for it to cooperate with other federal and state agencies on management issues of mutual concern.

Representative Comment: 8351B

B Comment: If brucellosis is an issue, it should be managed in a cooperative plan, incorporating Montana's help but managed by the National Park Service.

Response: All the agencies recognize that no single agency has sufficient jurisdiction and authority to manage the bison at all times and in all places. Cooperative management by the federal and state agencies, therefore, is necessary.

Representative Comment: 10A

C Comment: There is no respect for the management goals of national parks to protect and preserve natural free-roaming wild animals like bison.

Response: The agencies have worked for many years to develop a bison management plan that provides for the tolerance of bison outside Yellowstone National Park while reducing the risk that bison will transmit brucellosis to cattle. The goal of the plan is to balance the need for reducing the risk of transmission with allowing bison outside the park on federal public lands and those private lands where the landowners tolerate bison.

Representative Comment: 1523B

D Comment: The National Park Service has no legal authority over free-ranging bison and cannot downgrade the brucellosis-free status of Montana.

Response: Technically, these commenters are correct that National Park Service cannot downgrade Montana's brucellosis-free status. However, in expressing their concern, the commenters probably confusing the authority of the National Park Service with that of APHIS. For the authority of APHIS, please refer to APHIS comments in "Livestock Operations: Cattle — Brucellosis Class-Free Status" in this volume.

Representative Comment: 2271A

E Comment: The purpose of the plan has to be in the best interest of the bison herd because Yellowstone National Park was created for its wildlife and its ecosystem.

Response: The agencies believe a plan that balances a reduced transmission risk with increased tolerance of bison outside the park will best provide for the long-term needs of the bison. Without this plan, there likely would be little or no tolerance of bison outside the park, which is not in the best interest of the bison.

Representative Comment: 10386B

F Comment: Yellowstone was a national park before Montana, Wyoming, and Idaho were states. Therefore, Yellowstone National Park concerns should have precedence over state interests, especially on public lands adjoining the park.

Response: The seniority of the legal entities supporting an issue is irrelevant to the plan. All parties recognize their shared goals and differing mandates and have tried to develop a plan that protects these interests.

Representative Comment: 10502G

G Comment: The natural regulation policy practiced by Yellowstone National Park does not exempt the National Park Service from its responsibility to be a good neighbor to bordering states.

Response: The same management policies that provide for management by natural processes also require working with authorities in neighboring jurisdictions on various issues of mutual concern, including the setting of harvest levels for game species that move to and from the parks.

Representative Comment: 10638P

H Comment: The National Park Service should have taken sole responsibility for the bison management plan because its mission is different from that of the Montana Department of Livestock, APHIS, and the U.S. Forest Service.

Response: The agencies acknowledge that each of the cooperating agencies has a different mission. In defining the need for action (DEIS, p. 11) the agencies also noted that Yellowstone National Park is not a self-contained ecosystem for bison. When bison migrate, they move from one jurisdiction with one set of management objectives to another jurisdiction with another set of objectives. Therefore, the cooperation of all of the responsible agencies is required to fully manage the herd and the risk of transmission of brucellosis from bison to cattle.

Representative Comment: 12A

I Comment: It is inappropriate for the National Park Service to take responsibility for the success of Montana's livestock industry.

Response: The agencies have worked to develop a plan that protects Montana's livestock both from brucellosis and from unwarranted sanctions. The agencies recognize this is an important feature of the bison management plan.

Representative Comment: 14373AM

J Comment: The *Draft Environmental Impact Statement* fails to disclose or to adequately evaluate the specific components of the alternatives in light of the legal mandates defined by the National Park Service

Organic Act, Yellowstone's enabling legislation, the agency's regulations and the agency's management policies. The capture, test, and slaughter of bison is in direct conflict with the agency's mandate.

Response: Several organizations argued this in the context of suits challenging the *Interim Bison Management Plan*. Both the federal district court in Montana and the appellate court recognized that the National Park Service has the authority to manipulate wildlife in certain circumstances.

Representative Comment: 14714HH

K Comment: A vaccination program for bison in Yellowstone National Park would seemingly be inconsistent with NPS natural regulation mandates.

Response: The eradication of an exotic organism, such as *Brucella abortus,* is consistent with NPS *Management Policies*. The National Park Service also uses vaccinations on wildlife to protect animals from disease (e.g., reintroduced wolves have been vaccinated for rabies and distemper) and to control populations (e.g., feral ponies on barrier islands have been vaccinated with a contraceptive).

Representative Comment: 14714

L Comment: The National Park Service has an obligation to manage bison as a trust resource for the tribes. This fiduciary duty owed to the tribes can be carried out in concert with its statutory obligation to protect wildlife under the NPS Organic Act. President Clinton made a special commitment requiring all federal agencies to consult and confer with tribal nations. The *Draft Environmental Impact Statement* has ignored the federal trust responsibility for tribes and failed to recognize their sovereign nation status.

Response: The National Park Service recognizes that, although the bison in Yellowstone National Park are significant to many tribes, the bison are not a trust resource, the management of which triggers a federal trust responsibility. As set out in appendix I of the *Draft Environmental Impact Statement*, the National Park Service has met with the tribes expressing an interest in the management of bison in and around the park. The National Park Service intends to continue meeting with the tribes to discuss bison management.

Representative Comment: 15363G

M Comment: The National Park Service has a legal obligation, pursuant to its section 106 requirements, to complete a review of sites or objects eligible for inclusion on the National Register of Historic Places and to consult when the affected Indian tribes to avoid or mitigate damage or destruction to this historic bison herd. The National Park Service also must respect and comply with the Native Indian Religious Freedom Act and consult with the tribes on a government-to-government basis.

Response: As set out in appendix I of the *Draft Environmental Impact Statement*, the National Park Service has met with the tribes expressing an interest in the management of bison in and around Yellowstone National Park. The National Park Service believes that the management of the bison herd, in and of itself, does not trigger compliance obligations under the National Historic Preservation Act or the American Indian Religious Freedom Act.

Representative Comment: 15368H

N Comment: The federal government agreed to the 1995 settlement agreement without any public comment.

Response: The 1995 settlement agreement required the federal and state agencies to take immediate steps to develop a new *Interim Bison Management Plan*. Because there are no legal requirements for public comment on settlements in suits such as that brought by the state of Montana, the agencies proceeded with the actions required by the settlement agreement without delay.

Representative Comment: 15874AC

Issue 6: *U.S. Department of Agriculture, APHIS Authority*

A Comment: Does the U.S. Department of Agriculture, APHIS, have the authority to downgrade Montana's brucellosis class-free status based solely on the presence of potentially exposed bison in the state, because APHIS has no legal authority over free-ranging bison?

Response: The presence of bison in Montana from Yellowstone National Park will not cause Montana to be downgraded from a class-free state. The brucellosis eradication program, which confers state status, currently applies only to domestic cattle and bison, not free-roaming bison. However, it is imperative that these bison be controlled so that they do not have contact with cattle in Montana, which could result in the transmission of brucellosis from the bison to cattle. Should this transmission occur, Montana could lose its class-free status. For more information, see this volume, "Livestock Operations: Cattle — Brucellosis Class-Free Status."

Representative Comment: 90D

B Comment: The statement on page 196 of the *Draft Environmental Impact Statement* that APHIS mandates do not permit bison to freely roam in Montana is not correct.

Response: The phrase "APHIS mandates do not permit bison to freely roam in Montana" does not occur on page 196, or elsewhere in the document. The paragraph in question primarily addresses the Montana Department of Livestock's authority for the management of brucellosis-exposed and infected bison. The national brucellosis eradication program is implemented jointly by APHIS and the states. See the topic "Livestock Operations: Cattle — Brucellosis Class-Free Status" in this volume.

Representative Comment: 15420EB

C Comment: A lawsuit should be filed against APHIS to compel them to complete an environmental impact statement to demonstrate that brucellosis transmission could occur in the wild. "The economic threat posed by APHIS to the state of Montana over the hypothetical transmission to cattle from buffalo, seasonally migrating from federal lands in Wyoming, should be responded to with a lawsuit against APHIS to compel them to first complete an EIS to demonstrate that such transmission (of nonlethal infection) would occur in the wild between cattle and either bison or elk."

Response: The primary purpose of the National Environmental Policy Act is to ensure that environmental information is available to public officials and citizens before decisions are made and actions are taken. The 1998 NAS report states that, although the risk of brucellosis transmission from bison to cattle is low, it does exist. In order to address this risk, the agencies agreed to develop alternatives that provide for a free-ranging bison herd while protecting Montana's livestock interests. The modified preferred alternative in the final environmental impact statement relies most heavily on risk management by employing strategies to maintain separation between bison and cattle.

Representative Comment: 8442B

D Comment: Too much authority for bison management has been given to APHIS and the Montana Department of Livestock.

Response: As noted in the *Draft Environmental Impact Statement* (p. 54), cooperation among the agencies is essential to maintain a wild, free-ranging bison herd in Yellowstone National Park and to maintain Montana's federal brucellosis class-free status. Preparation of the *Draft Environmental Impact Statement* was based on current authorities, as delegated by the U.S. Congress and the Montana Legislature, of the agencies with relevant responsibilities for the management of bison that migrate from Yellowstone National Park into Montana. The mission of APHIS includes the prevention and control of

livestock diseases, increased efficiency of livestock production through improved animal health, preventing the entry into this country of exotic animal diseases, controlling foreign animal disease outbreaks in livestock, and related elements that are intended to protect the U.S. agricultural industry. The mission does not include managing public lands or bison. Instead, APHIS is working cooperatively with bison management authorities to address the disease risk presented by bison.

Representative Comment: 5455A

E Comment: The U.S. Department of Agriculture is operating through the livestock industry to gain more control over public lands.

Response: Federal law allows the livestock use of certain public lands. The effects of actions under the various alternatives on such use is discussed in the environmental impact statement (see volume 1, "Environmental Consequences: Impacts on Livestock Operations").

Representative Comment: 5278A

F Comment: A pasture-type bison health certification facility should be established in the tri-state area around Yellowstone National Park.

Response: One type of bison quarantine facility being considered is a pasture-type facility.

Representative Comment: 8375C

G Comment: APHIS should create a separate rating for cattle from within the Greater Yellowstone Area and those that are outside of and isolated from Greater Yellowstone Area bison, pursuant to CFR 78-40.

Response: A state is allowed to have a split status. However, in order to do so, there must be strict border controls to control movement between the two areas, and certain other provisions must be put into place. The state would be allowed to have the two statuses if it has the authority and the ability to maintain the two distinct areas. See additional responses in this volume under "Livestock Operations: Cattle — Brucellosis Class-Free Status" and "Socioeconomics: Cost to Livestock Operators."

Representative Comment: 9092N

H Comment: Alternatives 2, 3, and 7 do not move toward the eradication of brucellosis. Therefore, there is greater risk of brucellosis transmission, economic sanctions from other state animal health authorities, and regionalization by APHIS.

Response: All alternatives, including 2, 3, and 7, are consistent with objective 4, which is to "commit to the eventual elimination of brucellosis in bison and other wildlife." As noted in table 11 of the final environmental impact statement (volume 1), this would be accomplished through the use of a vaccine on eligible bison. The agencies have never intended the elimination of brucellosis to be within the scope of this management plan; this is stated on p. 29 of the *Draft Environmental Impact Statement*. However, vaccination reduces seroprevalence and does comply with the objective to show a commitment toward the long-term elimination of the *B. abortus* bacteria in the bison herd.

Representative Comment: 11160E

I Comment: The federal courts have determined that APHIS *Brucellosis Eradication: Uniform Methods and Rules* apply only to domestic livestock and cannot be extended to cover wildlife.

Response: The *Draft Environmental Impact Statement* does not propose to apply the uniform methods and rules to bison. However, as noted, the uniform methods and rules do apply to livestock, including

livestock that may associate with bison that originate from a brucellosis -infected bison herd. APHIS agrees that under its current regulatory scheme the brucellosis eradication program applies only to domestic cattle and bison, not free-roaming bison.

Representative Comment: 14540M

J Comment: The *Draft Environmental Impact Statement* fails to adequately disclose or evaluate the role of APHIS in the management of Yellowstone bison

Response: APHIS authority derives from statutes passed by Congress. The APHIS mission includes the preventing and controlling of livestock diseases, increasing efficiency of livestock production through improved animal health, preventing the entry into this country of exotic animal diseases, controlling foreign animal disease outbreaks in livestock, and related elements that are intended to protect the U.S. agricultural industry. The mission does not include managing public lands or wild, free-roaming bison. Instead, APHIS is working cooperatively with bison management authorities to address the disease risk presented by bison.

Representative Comment: 14714GG

Issue 7: *U.S. Department of Agriculture, Forest Service, Authority*

A Comment: Wildlife generally and bison specifically should have precedence over cattle grazing on public lands adjacent to Yellowstone National Park. Cattle should be kept away from bison. The Montana Department of Livestock should not make decisions that affect these public lands.

Response: The Board of Livestock has no authority over the management of public lands adjacent to Yellowstone National Park. However, the Montana Legislature has, through statute, assigned specific responsibilities to the board and the Department of Livestock for the management of bison that emigrate from Yellowstone National Park into Montana, irrespective of the land on which those bison occur, for the purpose of disease control. See this volume, "Livestock Operations: Public Grazing Allotments."

Representative Comment: 7029A

B Comment: This plan is about the management of national forest lands, maintained at the expense of the public, not just Montana citizens.

Response: The agencies considered the management of national forest lands, to the extent that this issue was within the scope of the environmental impact statement, by including various bison management strategies on public lands adjacent to Yellowstone National Park in the various alternatives.

Representative Comment: 11538AB

C Comment: Based on the court's ruling in *Parker Land and Cattle Company, Inc. v. U.S.*, ranchers who graze on public lands do so at their own risk and the U.S. Forest Service has no duty to warn lessees of potential dangers upon public lands. The permittee accepts the risk and the risk, is factored into the calculation of the fees.

Response: Costs of grazing on public land are lower, but do include a number of hidden costs, including regulatory requirements that figure into risk. For instance, on private land, a producer can kill a wolf if it is caught in the act of "killing, wounding, or biting" his livestock; on a federal grazing allotment, procedures would need to be followed that could delay immediate protection of the herd. Please see "Socioeconomics: Costs to Livestock Producers" in this volume for more information.

Representative Comment: 14540D

Issue 8: ***Coordination with Tribal Governments***

A Comment: The state of Montana should embrace cooperative management with the tribes, just as it is cooperating with the federal agencies.

Response: The state of Montana has represented that it is interested in continued tribal participation in the processing and distribution of bison carcasses. The federal agencies also are interested in the possibility of substantial tribal involvement in the operation of quarantine facilities and the distribution of live, disease-free bison. Decisions on managing the quarantine facility, however, must await further NEPA analysis, if that is a feature of the final plan.

Representative Comment: 6391L

B Comment: The group of cooperating agencies should include tribal representatives.

Response: The cooperating agencies acknowledge that the InterTribal Bison Cooperative and some Indian tribes from Montana, Wyoming, and Idaho have requested status as cooperating agencies in the management of bison that migrate from Yellowstone National Park. The federal agencies believe adding more cooperating agencies following the issuance of the *Draft Environmental Impact Statement* would not be appropriate. It is important to the federal agencies, however, to continue the government-to-government consultations with the tribes that have expressed interest in the management of Yellowstone National Park bison.

Representative Comment: 15079B

C Comment: The Montana Tribal Fish and Wildlife Commission advised the cooperating agencies that its purpose includes the protection and preservation of fish and wildlife resources as well as the maintenance of reserved hunting and fishing rights outside the exterior boundaries of reservations. Members of the commission include the Blackfeet, Crow, Sioux, Chippewa-Cree, Kootenai, Gros Ventre, Assinniboine, Northern Cheyenne, and Salish nations.

Response: The agencies acknowledge the Montana Tribal Fish and Wildlife Commission, its membership, and its purpose.

Representative Comment: 15363A

D Comment: The standing and authority of the federally recognized tribes is equal to that of the state of Montana for the management of bison. If hunting seasons are established, tribal members should have preference in the opportunity to hunt.

Response: This comment involves the interpretation of treaties between a tribe or tribes and the federal government. Treaty rights present very complex issues, and the resolution of those issues is beyond the scope of this EIS process. Regardless of treaty issues, however, the federal agencies will continue to consult with tribes on bison management issues.

Representative Comment: 17726J, 17738A

Issue 9: ***Authority of Other States***

A Comment: Brucellosis-infected wildlife occur throughout the Greater Yellowstone Area, not just the northern portion of Yellowstone National Park. Other states should be involved to control brucellosis throughout the Greater Yellowstone Area.

Response: The agencies acknowledge that the issue of brucellosis in wildlife in the Greater Yellowstone Area is broader than the scope of this environmental impact statement (see DEIS, p. 46), which is limited specifically to the cooperative management of bison that migrate from Yellowstone National Park into Montana. The involvement of other state and federal agencies in the management of brucellosis-affected wildlife in the Greater Yellowstone Area is the focus of the GYIBC.

Representative Comment: 9243C

B Comment: State animal health officials in other states must be willing to accept Montana's high-risk cattle without additional restrictions in order to implement some of the alternatives.

Response: As long as Montana continues to take actions that prevent brucellosis transmission from Yellowstone bison to cattle, there is no justification for additional sanctions against importation of Montana cattle by other states. Should another state contemplate imposing sanctions against Montana and those sanctions were not supported by accepted science, APHIS would attempt to convince the state that such sanctions would not be needed to protect its livestock.

Representative Comment: 9364FF

C Comment: Alternative 2 represents an unfunded federal mandate on the state of Idaho for disease management and bison population control. The state of Idaho indicated that the environmental impact statement assumes that if alternative 2 was adopted, the state of Idaho would be willing to accept the responsibility for policing this boundary area. This alternative is not acceptable to the state of Idaho, and it contends that the alternative could not be legally implemented.

Response: The agencies agree that the details of monitoring the border would need to be defined should this alternative be selected as the final plan. Monitoring responsibilities could, for example, be shared by federal and state entities.

Representative Comment: 11121L, 14305E

D Comment: All states, except Montana, have accepted the federal government's definition of "low-risk" bison.

Response: No state has placed additional import restrictions on Montana cattle, and Montana and the federal agencies have managed the risk of brucellosis transmission by maintaining separation of bison and cattle. To date, no state has formally accepted or not accepted the low-risk bison definition; however, there is no requirement for states to formally accept the definition, and there is no mechanism for them to do so.

Representative Comment: 10475AE

E Comment: The governors and the legislatures of Wyoming, Idaho, and Montana should authorize bison as nongame wildlife and permit uncensored NEPA comments on public land use issues.

Response: The Montana Legislature has assigned specific responsibilities to the Departments of Livestock and Fish, Wildlife and Parks. Wyoming and Idaho are not party to this environmental impact statement and will not be bound by the corresponding record of decision. The federal agencies are not aware of support for the suggestion that comments by Wyoming, Idaho, and Montana state agency officials on public land issues are censored.

Representative Comment: 14373AEE

F Comment: The *Draft Environmental Impact Statement* fails to adequately disclose or evaluate the role of other states in the management of Yellowstone bison. The agreements that other states have made with

APHIS regarding the national brucellosis eradication program should preclude those states from imposing sanctions against Montana's cattle, if APHIS has not changed Montana's brucellosis-free status. The presence of bison, even if exposed or infected, should not be used to justify sanctions on Montana cattle imposed by other states.

Response: The Cooperative State-Federal Brucellosis Eradication Program began in July 1934, under an amendment to the Jones-Conelly bill (Public Law 142). In 1947, the United States Livestock Sanitary Association (now the U.S. Animal Health Association) recognized that brucellosis should be under a national program and recommended adoption of the first uniform methods and rules for eradication of the disease on a herd, area, state, and national basis. In 1956 Congress authorized the secretary of agriculture to enter into cooperative agreements with individual states for a brucellosis eradication program based on the recommended brucellosis eradication uniform methods and rules. The uniform methods and rules describe standard procedures for surveillance, testing of suspect exposed or affected domestic cattle and bison herds, quarantine of exposed or affected herds, and restrictions on interstate shipment of cattle and bison originating in states with affected herds. Routine compliance with the uniform methods and rules is enforced pursuant to the respective authorities of the individual state animal health agencies. The potential for other states to impose sanctions is a reality, and the cooperating agencies have no authority to amend the authorities and responsibilities of animal health officials in other states. The federal agencies believe sanctions by other states aimed at cattle produced in Montana likely would run afoul of the U.S. Constitution's commerce clause. Because all of the alternatives in the *Draft Environmental Impact Statement*, as well as the modified preferred alternative in the final environmental impact statement, adequately address the risk of brucellosis transmission, sanctions from other states would discriminate against Montana's interests without serving the sanctioning state's legitimate local interests. In addition, even if the sanctions would have only indirect effects on interstate commerce and regulate evenhandedly, they would still probably run afoul of the commerce clause because the burden on interstate commerce would clearly exceed the local benefits.

Representative Comment: 14714GG

G Comment: Several alternatives would require other states to amend their animal health regulations to accept Montana's higher-risk cattle without additional restrictions.

Response: None of the alternatives would require other states to amend their animal health regulations to accept Montana cattle, and Montana's cattle are not at higher risk than cattle from other class-free states. There are elements in each alternative to ensure that livestock are protected from the risk of brucellosis and that Montana is protected from the risk of reduction in its brucellosis status. These elements are listed for each alternative in volume 1, table 11.

Representative Comment: 14816

H Comment: Ensuring that other states respect Montana's brucellosis-free designation is the best approach to ensure a quick and cost-effective solution.

Response: The presence of bison in Montana from Yellowstone National Park will not cause Montana to be downgraded from a class-free state. The brucellosis eradication program, which confers state status, currently applies only to domestic cattle and bison, not free-roaming bison. However, it is imperative that these bison be controlled so that they do not have contact with cattle in Montana, which could result in the transmission of brucellosis from the bison to cattle. Should this transmission occur, Montana could lose its class-free status. The final environmental impact statement shows the mitigating measures to be taken under each alternative relative to risk of bison-to-cattle brucellosis transmission. These measures are shown in volume 1, table 11 ("Methods Each Alternative Uses to Ensure Each Agreed-Upon Objective is Met").

Representative Comment: 15671EE

I Comment: The *Draft Environmental Impact Statement* should not compromise the authority of state animal health officials over diseases and diseased animals within their respective states.

Response: It is unclear whether this comment refers to Montana, other states, or both. The environmental impact statement does not compromise state authorities over livestock diseases in any state. The environmental impact statement includes elements in each alternative to protect Montana cattle from the risk of brucellosis, thereby ensuring that cattle imported from Montana into other states will not pose a risk of brucellosis transmission.

Representative Comment: 14816A

Issue 10: ***Coordination with Private Organizations***

A Comment: Bison management should be directed by a diverse group, including wildlife management experts, members of the environmental community, and the InterTribal Bison Cooperative.

Response: The agencies will implement the bison management plan in a manner that is consistent with the final environmental impact statement as approved in a record of decision. The agencies do not have the authority to delegate responsibility for bison management to representatives from private organizations.

Representative Comment: 1884A

B Comment: Private entities, in coordination with government agencies, will work to establish a voluntary program to compensate for private property damage and to offer incentives to modify livestock operations.

Response: The agencies appreciate efforts by interested people with differing interests to work together on matters related to bison management. The agencies do not have the authority to make decisions that are predicated on the assumption that private citizens will participate in voluntary programs.

Representative Comment: 14484H

Issue 11: ***Public Ownership of Wildlife***

A Comment: The *Draft Environmental Impact Statement* violates the public trust doctrine because it addresses only private, not public, interests. Certain public resources are enjoyed by everyone, and these resources are subject to demands which necessitate that the state act as trustee to prevent their abuse.

Response: The *Draft Environmental Impact Statement* was prepared for the purpose of maintaining a wild, free-ranging population of bison and to address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana. These purposes and the objectives and constraints associated with them are within the collective authority of the cooperating, public agencies. The agencies believe the various alternatives address any public trust issues by meeting the purpose of the environmental impact statement.

Representative Comment: 12017F

Issue 12: ***Other Public Lands***

A Comment: Healthy, excess bison should be moved to other public lands outside Yellowstone National Park.

Response: If a quarantine facility is a feature of the final plan, the federal agencies would support providing bison that clear quarantine to herds on public lands and tribal reservations.

Representative Comment: 2127A

Issue 13: ***Land Acquisition***

A Comment: The federal government should actively pursue land acquisition for bison migration routes and winter ranges outside Yellowstone.

Response: The *Draft Environmental Impact Statement* addressed this issue (p. 36). In addition, after the draft statement was issued the U.S. Forest Service acquired fee title and easements on lands north of the park. A large portion of the money used to acquire these interests was from the U.S. Department of the Interior, with the understanding that some of the lands would be available for bison management. The federal agencies continue to negotiate with private land owners toward that end.

Representative Comment: 8442B

Issue 14: ***Private Land***

A Comment: Bison should be removed from private land only when absolutely necessary and then only with nonlethal methods.

Response: The *Draft Environmental Impact Statement* addressed this issue (p. 58).

Representative Comment: 7820E

B Comment: Ranchers who choose to live and ranch at the boundary of a protected park should understand the special consideration to be given to the interests of that park. Deferring to the interests of those who choose to live nearby and engage in economic activities which are incompatible with the existence of the park sets a very dangerous precedent.

Response: The agencies do not agree that private property owners who live in the vicinity of Yellowstone National Park have a greater obligation to protect the interests of the park than other citizens of the United States, and the agencies have no authority to impose such an obligation.

Representative Comment: 9092Y

C Comment: People who live in the Greater Yellowstone ecosystem should have the responsibility of bison tolerance. The state must initiate a campaign for educating private property owners.

Response: The presence of wildlife is an expected feature of living in rural areas of the western United States. The state and federal governments, however, have an interest in managing wildlife, to the extent practicable, including the bison that originate in Yellowstone National Park. The GYIBC has initiated a program to develop educational materials for landowners in the vicinity of the park.

Representative Comment: 9382N

D Comment: Private landowners would have to be willing to sell their lands in order to implement some of the alternatives.

Response: The agencies agree with this comment. The agencies have no authority to impose specific requirements on private landowners to facilitate implementation of a bison management plan. All land acquisitions would be on a willing-buyer/willing-seller basis. Changes in cattle operations on private land also would occur on a voluntary basis.

Representative Comment: 9364FF

E Comment: The agency should collect property damage information and should provide compensation only if it exceeds the amount of damage caused by elk.

Response: The agencies agree that preventing damage to private property is important, and the procedures for removing bison from private land are discussed in the environmental impact statement (p. 58 of the DEIS).

Representative Comment: 10692J

Issue 15: ***Legally Implementable***

A Comment: The agencies did not define the term "legally implementable." Without a definition, the reader must assume that all of the proposed alternatives could be implemented under current state and federal laws or rules. This is not the case.

Response: The *Draft Environmental Impact Statement* indicated each specific element, e.g., bison hunting, that would require revisions to current law prior to implementation.

Representative Comment: 14816B

Issue 16: ***Other Authority Issues***

A Comment: The plan will treat bison like zoo animals.

Response: We do not believe allowing bison to freely roam the two million acres of Yellowstone Park is akin to keeping them in a zoo. In addition, bison are not kept in the park in most alternatives, but are allowed to access a wide portion of the habitat that would naturally be available to them. If the population of bison is kept to 1,700–3,500, data and experience suggest they will continue to indefinitely occupy the park and portions of lands outside the park identified in the environmental impact statement as winter range indefinitely.

Representative Comment: 279A

B Comment: Through the application of substantive, scientifically sound management strategies, rather than political influence, the conflict in Montana could be settled with benefits to both livestock producers and wildlife.

Response: This environmental impact statement is intended to provide the basis for a substantive, scientifically sound bison management strategy. The agencies acknowledge that there is considerable disagreement among people who are interested in and affected by bison management regarding the definition of the term "substantive, scientifically sound management strategies." The agencies approached the preparation of the environmental impact statement from a perspective that the best application of science is an objective determination of the range of reasonable management options, the means to develop and apply specific management strategies, and the determination of the consequences of each management option. However, the determination of the most appropriate management strategy also includes consideration for issues other than science. The agencies acknowledged that, within the scientific community and among the people who are interested in bison management, there are differing opinions about the appropriateness or necessity of a management emphasis on the control or elimination of *B. abortus*, the environmental consequences of actions necessary to control or eradicate the disease, and the consequences of not controlling or eradicating brucellosis from this bison herd.

Representative Comment: 860C

C Comment: Bison should be designated as an endangered species.

Response: In February 1999 the U.S. Fish and Wildlife Service received a petition to list the Yellowstone bison under the Endangered Species Act. As of April 1, 2000, that agency has not been able to respond to the petition. We do not believe allowing bison to freely roam the 2 million acres of Yellowstone Park is akin to keeping them in a zoo. In addition, bison are not kept in the park in most alternatives, but are allowed to access a wide portion of the habitat that would naturally be available to them. If the population of bison is kept to 1,700–3,500, data and experience suggest they will continue to occupy the park and portions of lands outside the park identified in the environmental impact statement as winter range indefinitely.

Representative Comment: 10432B

D Comment: The schedule for developing of the bison management plan, as agreed to in the court settlement, is not being followed.

Response: The settlement agreement provided that any of the cooperating agencies could withdraw from the "Memorandum of Understanding" setting up the process for developing the long-term bison management plan. The consequence of such a withdrawal would be the dismissal of the suit, including the settlement agreement. In December 1999 the federal agencies did withdraw from the memorandum of understanding and requested that the court dismiss the suit. Over the objections of the state, the court granted that motion. Prior to that, while the court maintained continuing jurisdiction, the cooperating agencies kept the court informed of the status of developing the draft and final environmental impact statements.

Representative Comment: 15420TB

E Comment: What changes in federal regulations would be necessary to allow shipment of live bison to Indian reservations or other areas without quarantine?

Response: Currently, title 9 ("Animal and Animal Products"), *Code of Federal Regulations*, part 78 ("Brucellosis"), subpart C ("Restrictions on Interstate Movement of Bison Because of Brucellosis") governs the interstate movement of bison. Changes would have to be made to title 9 because generally no provisions have been made to move brucellosis-exposed or reactor bison from Yellowstone National Park to Native American reservations or to places other than recognized slaughtering facilities, quarantined feed lots, or other approved destinations.

Representative Comment: 11A

Socioeconomics

socioeconomics

Benefit and Cost Impacts (SO-36)

Issue 1: ***Comparison of Costs and Benefits for Each Alternative***

A Comment: The final environmental impact statement should give a clear analysis of costs vs. benefits of each alternative, measured against the plan's objectives: maintain a free-ranging bison herd while protecting the economic interests of Montana by protecting its brucellosis class-free status. For example, the implementation cost of alternative 2 is 25% of that projected for alternative 7, yet the latter alternative is the agencies' "preferred" plan.

Response: The final environmental impact statement now provides an extensive separate comparison of the costs and benefits of each alternative organized by objectives (see volume 1, "Environmental Consequences: Impacts to Socioeconomics"). However, economics is only one of the possible criteria for selecting a preferred plan.

Representative Comment: Form 24K, 11409aFF

B Comment: Commenters questioned the cost of the alternatives measured against other less costly options. Some questioned the cost-effectiveness of a quarantine facility, for example, when spatial and temporal separation of cattle and bison would manage risk of brucellosis transmission. Others asked why public lands for grazing in the area couldn't be converted to steer-spayed heifer operations instead of more costly bison management activities (capture, test, slaughter, vaccination, quarantine, etc.)

Response: The cost-effectiveness of specific alternative actions to achieve the different objectives is now explicitly analyzed in the final environmental impact statement. With regard to quarantine, the finding is that this is one of the more costly actions and the contribution to reducing risk, given spatial and temporal separation is small, as noted in this comment. Steer or spayed-heifer operations could also be a cost-effective action, but the cost of conversion is not zero (see this volume, "Socioeconomics: Cost to Livestock Operators"). However, which specific actions to include in the alternatives is based not only on cost-effectiveness, but other considerations as well. In general, the alternatives have been designed to infringe as little as possible on ranchers' rights to continue their operations. The modified preferred alternative does provide for a number of cost-effective actions to manage and monitor cattle, including 100% calfhood vaccination (voluntary or mandatory), increased surveillance testing, and possible changes in allotment turn-on dates to ensure spatial and temporal separation.

Representative Comment: 366B, 543B

C Comment: Why was the cost-effectiveness of the plan not fully measured in terms of costs to the taxpayer; e.g., the average cost of trapping, testing, transporting a bison is $850. These actions are being taken to protect less than 2,000 cattle, whose owners pay the U.S. Forest Service a total of $5,000 per year to graze on public lands. Commenters felt there was inequity in costs vs. benefits.

Response: The costs and benefits of the various actions and alternatives are now more fully evaluated in the final environmental impact statement. The comment is correct in noting that in general the bison management costs proposed far exceed the annual return to the U.S. Treasury from the nearby public grazing allotments. Implicitly, a solution to the problem is to simply end these grazing allotments. A complication is that there are also cattle on private grazing lands in the area. Considerations of ranchers' rights and a desire to protect the ranching industry would seem to prevent eliminating all livestock grazing in the area. Additionally, in the absence of a plan, the 1998 NAS study concludes that bison populations would continue to grow and could range in ever-increasing distances from Yellowstone National Park. Given that ranching will likely retain a presence in the Greater Yellowstone Area, the real costs of not controlling the risk of brucellosis is not only the damage to local herds, but that the state of Montana could lose its class-free status. These costs are detailed in the response to "Socioeconomics: Cost to Livestock Operators" in this volume and is now incorporated in the final environmental impact statement.

Representative Comment: 1156A, 2077D, 11409aY

D Comment: Commenters submitted information regarding the costs of other alternatives compared to the *Draft Environmental Impact Statement* alternatives. Specifically, the costs of the *Draft Environmental Impact Statement* alternative 7, compared to "Plan B" and the "Citizens' Plan" were submitted team for consideration. Commenters claimed that "Plan B" is the most cost-effective option, because it focuses on removing cattle from the area. Others supporting the "Citizens' Plan" noted that it would be far less costly to implement than the agencies' proposed plan.

Response: Although "Plan B" may be cost efficient, it does not accomplish many of the objectives of taking action as described in volume 1, "Purpose of and Need for Action: Objectives and Constraints." The responses to comments in this volume under the heading "Alternatives: Plan B" have more information on why the agencies do not consider "Plan B" reasonable. The main cost element in this plan is vaccination of bison, with costs drawn from the environmental impact statement. The difference is that "Plan B" assumes that the environmental impact statement vaccination action would achieve zero seroprevalence in bison in 15 to 20 years. This is at odds with the predictions in the environmental impact statement as well as the findings of the 1998 NAS study. In short "Plan B" does not appear to meet the plan objectives. The other cost element in "Plan B" is either steer or spayed-heifer conversion or $600,000 of fencing. These are both potentially cost-effective actions; however, in the absence of a plan and actions (with costs) to control bison population growth, the area where such actions would have to be applied is ever expanding. Other aspects of this plan, however, have potential merit, such as suggested institutional changes in APHIS regulation of brucellosis. See "Socioeconomics: Reasonable Project Costs — Issue 2" in this volume for more information on the costs and benefits of alternatives submitted by commenters after release of the *Draft Environmental Impact Statement.*

The "Citizens' Plan" has some important differences compared to, for example, the final environmental impact statement modified preferred alternative. However, this plan also includes many of the same costly actions, such as quarantine. The benefit-cost outcome for the "Citizens' Plan" is within the range of outcomes for the final environmental impact statement alternatives.

Representative Comment: 2820A, 4354B, 15420Q

E Comment: Why was the hunting of bison not more fully analyzed as a cost-effective mechanism to remove bison compared to capture, test, slaughter, and quarantine operations. Hunting fees could be used to purchase additional winter range.

Response: Hunting is a cost-effective action in that fees and potential nonmarket benefits may offset costs, as described in the final environmental impact statement. Fees could also, in principle, be used to purchase winter range or easement, but at the plausible hunting harvest levels, they would not cover the hunt management costs for the state of Montana. Alternative 3 relies on hunting as a primary mechanism to control bison distribution.

Representative Comment: 2376D, 2176B, 8745I

F Comment: The final environmental impact statement should compare the costs of managing other wildlife species to that proposed for bison management. Other wildlife management programs (wolf reintroduction) reimburse livestock operators for losses and questioned why this could not be done in the bison program.

Response: In principle it would be possible to reimburse livestock operators for losses. In the wolf recovery program this is being done by a private organization, Defenders of Wildlife. At present, APHIS already will reimburse livestock owners if infected herds need to be depopulated. However, the cost of a brucellosis infection would not only impact the owner of the infected herd, but also the state of Montana if it lost its class-free status and had to test all cattle for brucellosis being marketed out-of-state. (see this volume, "Socioeconomics: Cost to Livestock Operators"). It would be potentially very costly ($5 million

to $16 million per year for testing costs) to reimburse all livestock owners for the impacts of even just two cases of infection within a two-year period. At some point, it is more cost-effective to control the risk than to compensate those who bear the costs. However, it may be possible to define a smaller potential class A area than the entire state (see this volume, "Socioeconomics: Cost to Livestock Operators"). In such a case, costs would be reduced, depending on the area where testing would be required.

Representative Comment: 4208G

G Comment: A cost/benefit analysis should be presented in the *Draft Environmental Impact Statement* that accounts for the $20 million annual viewing benefits of wildlife vs. livestock grazing and the title acquisition fee for the 8,000 acres discussed in alternative 7. Alternatives 1, 4, 5, and 7 allow for slaughter of seropositive bison and the quarantine of seronegative bison, which interferes with the bison's entitlement to use the summer and winter range. These alternatives, according to the commenters, also produce an adverse impact upon bison, while benefiting only 4% of the summer grazing animal unit months in Gallatin/Park Counties.

Response: As noted in the final environmental impact statement, volume 1 (see "Affected Environment: Recreation, Wildlife, and Bison Viewing"), the change in viewing benefits associated with changes in bison populations across the various alternatives is likely to be quite small. The only empirical estimate available that is specific to bison, is zero (not $20 million). The benefits of the proposed 8,000 acre fee title acquisition referenced by the commenter are now explicitly estimated in the final environmental impact statement. From the standpoint of benefits and costs, because these lands have now been acquired, the acquisition costs in the plan are zero (these are sunk costs). The costs and impacts associated with bison management need to not only be compared to the value of summer range in the SMAs, but also the risk of a loss of class-free status. (See response to comments C and F above.)

Representative Comment: 7319D

H Comment: The *Draft Environmental Impact Statement* economic analysis was flawed because it did not accurately display the impact of slaughtering bison. Commenters noted DEIS table 46 and questioned why the loss of economic value of bison ($1,800/bison) wasn't compared to the value of grazing land and cattle. They requested that specific figures on the profit realized from cow-calf pairs on the affected range vs. economic loss from slaughtered bison be displayed in the final environmental impact statement.

Response: As noted in comments C and F above and in the responses in "Socioeconomics: Cost to Livestock Operators," the economic tradeoff of bison and cattle is more complex than just a substitution of one species for another on a given range. The problem is because bison carry a disease that can be transmitted to cattle, the potential impacts are not limited to the local herd but could theoretically affect the entire state. This means that in the absence of a plan and some necessary costly bison management actions, the direct and indirect impacts of this herd could spread over a larger area.

Representative Comment: 14209U

I Comment: The *Draft Environmental Impact Statement* economic analysis was inadequate because it did not accurately display the cost of grooming snowmobile trails. The cost of grooming trails should include the cost of increased bison interaction with cattle, i.e., the increased management of bison using groomed roads to access winter range outside the park.

Response: In principle it is correct to note that there could be costs associated with trail grooming that relate to bison management. However, these costs rest on the view that not grooming roads for snowmobiles will actually affect bison movements. Field experiments to quantify this relationship or test the hypothesis have not been done; however, based on an analysis of winter movements, bison populations, and snow depths, the 1998 NAS study concludes that it would be optimistic to think that ending grooming will substantially affect bison movements.

Representative Comment: 14258C

Issue 2: ***Comparison of Economic Benefits of Tourism in the Greater Yellowstone Area vs. Agriculture***

A Comment: Commenters felt that the *Draft Environmental Impact Statement* downplayed the economic importance of tourism and recreation related to Yellowstone National Park and the surrounding area compared to the economic importance of agriculture. They argued that there are costs and benefits that go beyond the state of Montana; e.g., if tourism drops in Yellowstone National Park, it affects the entire region.

Response: The relative economic importance of tourism and recreation in the Greater Yellowstone Area is shown in this final environmental impact statement (volume 1, "Affected Environment") to exceed that of agriculture. Nonetheless, the issue is how the alternatives will impact these industries. As noted in the response to comments 1C and 1F above, the potential impacts on agriculture are statewide. Although it is true that tourism impacts are potentially also statewide, or even regional, survey data clearly show that the impacts on tourism are concentrated in the vicinity of the park. Because regional economic impacts are by definition distributional impacts (fewer visitors to Yellowstone National Park mean more visitors somewhere else), the choice of region of impact depends on what region decision makers care about. If one draws the regional boundary large enough (for example, the nation) the net impacts on tourism go to zero because a loss of visitation in one area is a gain in another.

Representative Comment: 230O, 14209X

B Comment: The growth of economic sectors in the counties surrounding the park is more toward recreation, service industries, and tourism rather than agriculture. They question why the environmental impact statement concludes that there would be significant adverse economic impacts should an outbreak occur, especially in light of 21 USC 134a(d), which, according to the commenters, allows for compensation to the livestock producer for their loss of a herd to brucellosis.

Response: The comment is correct with regard to the issue of the sources of economic growth, as noted in the environmental impact statement. As noted in responses to 1C and 1F, not only are there direct impacts on the owner from infected herds (which can be partly or wholly compensated, see this volume, "Socioeconomics: Cost to Livestock Operators") but also potentially on other producers who may incur some testing costs.

Representative Comment: 14700R

Issue 3: ***Costs to the State of Montana***

A Comment: The *Draft Environmental Impact Statement* fails to demonstrate that the viability of the Montana livestock industry would be threatened under any alternative, and therefore, economic impacts to the state should be characterized as nonexistent.

Response: The viability of the Montana livestock industry may not be threatened (although it is noted in this volume, "Socioeconomics: Cost to Livestock Operators," that net returns in this industry hover around zero). Nonetheless, the loss of class-free status is a real possibility and would include real changes in cattle testing requirements (and associated costs) for marketing cattle out-of-state and possibly real changes in price.

Representative Comment: 2122C

B Comment: The *Draft Environmental Impact Statement* fails to accurately portray the potential state, regional, and national costs to livestock producers, should cattle be infected with brucellosis from Yellowstone National Park bison. The disease may not be detected for a considerable period of time, and cattle from the Greater Yellowstone Area are exported to markets throughout the United States. Therefore,

should an outbreak occur, it would have far-reaching economic consequences. These consequences need to be evaluated in the final environmental impact statement.

Response: These consequences are now evaluated in the final environmental impact statement. The consequences are, as noted, a function of how far the infection spreads before it is detected.

Representative Comment: 9364Y, 10399F

C Comment: Commenters disagreed with the *Draft Environmental Impact Statement* analysis of fiscal impacts to the state of Montana if certain alternatives were implemented. They noted that the fiscal impacts to the state, with the exception of alternatives 5 and 6 (phase 2), range from $140,000 to $420,000 per year for 15 years, and in their opinion this would be a significant impact.

Response: Fiscal impacts in the range of $140,000 to $420,000 are what one could call significant. However, in the context of the overall state general budget, they are also what one could call minor.

Representative Comment: 9364S, 15420SB

Issue 4: ***Cost of The Livestock Industry Using Public and Private Lands in the Greater Yellowstone Area***

A Comment: The *Draft Environmental Impact Statement* economic analysis is inadequate. There are indirect and cumulative impacts from livestock use of public lands that must be evaluated. The cost to taxpayers to subsidize or support the use of public lands by livestock growers are not fully accounted for, given the potential other uses of those lands, i.e., wildlife, and in particular, bison. Closing the allotments would be more cost-effective.

Response: See the response to comment 1C above. In addition, the comment is correct in noting that closing grazing allotments would save in direct management costs. While these costs may exceed the grazing fees, they are also small in the context of the costs at issue here.

Representative Comments: 9369P, 9382L, 11031F

B Comment: The *Draft Environmental Impact Statement* claims that the value of private-grazing resources could increase if disease risks and damage by bison were reduced. Only a state wide average value of grazing lands is provided; no values are presented for private grazing lands near the park. In order to accurately claim that disease presence or absence has a positive or negative impact on private-grazing resources, one would need to know those values and determine what, if any, relationship disease has on land values. Without this data, the statement in the *Draft Environmental Impact Statement* is not valid.

Response: The value of private-grazing resources is a function of, among other things, the return to cattle ranching. In this volume, "Socioeconomics: Cost to Livestock Operators," it is suggested that a loss of class-free status could reduce the price of livestock sold from the state of Montana. Economic theory supports the notion that such a price reduction "could" reduce the value of private grazing resources. Alternatively, lands used for grazing could be used for other activities, which may be more valuable than grazing. As the comment suggests, one would need to perform research to quantify the relationship.

Representative Comment: 15420HB

Issue 5: ***Revision of Draft Environmental Impact Statement Cost-Benefit Tables***

A Comment: Commenters had specific questions and concerns regarding *Draft Environmental Impact Statement* tables 46 and 47, stating these tables were inaccurate, inadequate, and confusing. They wanted these tables revised to be more useful to the public and decision makers as follows:

1. Costs for developing, testing, and implementing the bison vaccine (including the remote delivery system) must be included in project costs.

2. Identify how land acquisition costs were calculated, and account for the money already spent for the Royal Teton Ranch since the *Draft Environmental Impact Statement* was published.

3. Alternative 2 costs of not grooming for snowmobiles (as a bison management tool) must include benefits derived from increased solitude and serenity, decrease in air pollution, reduced disturbance to wildlife, and restoration of natural regulation of bison. It is not sufficient for the environmental impact statement to disclose just the negative impacts of eliminating snowmobiles on local economies. Benefits must also be displayed.

4. Economic impacts on the value of the national park experience from the capture, test, slaughter of bison.

5. The origins of the estimates used to calculate net present values presented in the table must be disclosed, as well as the correction factor for the discount value to 1997.

Response: The final environmental impact statement includes a discussion of alternative and action-specific costs and benefits. Responses to the itemized questions above are as follows:

1: This view would also imply that one would need to estimate the general benefits of this research to society. Although at this point the costs of researching and testing a bison vaccine have been largely paid (therefore, a sunk cost), the cost of implementing a bison vaccination program is included in the cost of each alternative.

2: The costs for the land acquisition described in alternative 7 have now been expended.

3: With regard to natural regulation, see the response to comment 1I above. Based on an analysis of winter movements, bison populations, and snow depths, the 1998 NAS study concluded that it is optimistic to think that ending grooming will affect bison movements. In response to other comments on the *Draft Environmental Impact Statement*, the emphasis in the final environmental impact statement is on direct costs and benefits, with an evaluation of what each action contributes to the plan's main objectives. The action of not grooming for snowmobiles relates to the objectives associated with reducing the risk of brucellosis transmission. The judgment of the NAS study is that the contribution of not grooming is probably quite slim; accordingly, the benefits are also negligible. In principle the secondary benefits (from the perspective of this environmental impact statement) of increasing solitude, decreasing air pollution, and reducing disturbance to wildlife could be quantified using nonmarket valuation. These benefits would be both direct-use and passive-use values. However, the development of such estimates, including any necessary original research to quantify these benefits, has not been done.

4: The main impact of capture, test, and slaughter operations on park visitors arise from the need to institute park closures in some areas. The impacts of park closures on visitor numbers has been estimated and is reported in the final environmental impact statement. Given that there will be park closures associated with more extensive levels of capture, test, and slaughter operations, visitors will be isolated from these experiences. Capture, test, and slaughter operations that do not lead to park closures would be conducted during the winter, when visitation is at lower levels and generally away from areas where visitors will be concentrated. Accordingly, these impacts would likely be minor in the context of overall park visitation over the course of the year. The NAS study does comment that the "construction of facilities necessary to handle bison would detract from the natural aura of the park and might have detrimental effects on the park ecosystem." These possible impacts have not been quantified.

5: Alternative specific cost and benefit tables are now provided. For all present-value calculations in the environmental impact statement socioeconomics sections, the discount rate is a 7% real (not nominal) discount rate based on Office of Management and Budget guidelines for benefit-cost analysis.

Representative Comment: 14714 PP

Cost to Livestock Operators (SO-37)

Issue 1: ***Impact of a Brucellosis-Free Yellowstone National Park Bison Herd***

A Comment: Include a real analysis of the impacts to the livestock industry and a meaningful analysis to a disease-free buffalo herd.

Response: The potential loss of class-free status is addressed below under issue 3; also see "Livestock Operations: Cattle — Brucellosis Class-Free Status." Given that an estimated 90% of Montana cattle producers vaccinate their female calves, compared to nearly 100% of producers in the Yellowstone area, changes in vaccination expenditures would be very small. See "Socioeconomics: Benefit and Cost Impacts" and "Socioeconomics: Nonmarket Values."

Representative Comment: 2740B

Issue 2: ***Conversion from a Cow-Calf to a Steer or Spayed Heifer Operation***

A Comment: Conversion of cattle operations to steer or spayed heifers would have "extensive economic ramifications" for cattle producers.

Response: The possibility of affected producers eliminating the risk of brucellosis transmission to their herds by converting from cow-calf to steer or spayed heifer enterprises is discussed on p. 237 of the *Draft Environmental Impact Statement*. It is noted in the *Draft Environmental Impact Statement* that the variables involved in conversion are too numerous for a comprehensive calculation of the costs. Still more difficult would be an estimate of the amount of money necessary to compensate producers who would voluntarily convert their operations.

Follow-up discussions with Montana Department of Livestock staff, private ranchers, and academics have underscored both the range and depth of changes that would need to be undertaken to convert a cattle operation. Although a calculation of costs is not feasible, the following items are some that should be considered.

Conversion would mean selling the breeding herd. Prices received for cows and calves sold on the open market would probably be lower than their breeding genetics would earn if they were not sold. In other words, prices received would likely fail to fully compensate for foregone future production by cows and heifers. Any premium prices that the producer would have earned from his sales, due to desirable carcass traits of his breeding herd, would also be lost. Acquiring a comparably favorable reputation after conversion to a steer or spayed heifer operation would require additional time and investment, particularly since there would be yearly replacement of the herd. For a steer or spayed heifer operation, either weaner calves would need to be purchased in the fall and carried through the winter (thereby replacing other stock that had been using those grazing resources previously), or yearlings would be purchased in the spring for grazing over the summer (implying other use would be made of any winter pastures owned by the operator). In either instance, a steer or spayed heifer operation would be subject to purchasing and selling prices that are more uncertain and variable than selling prices for calves. Higher marketing risks, compared to those faced by cow-calf operations, would probably lead to greater reliance on transactions using futures markets.

The management of yearlings is much more labor demanding. In general, any handling activities would require more labor, since a young steer is much more difficult to control than a calf that moves with its mother in an environment the cow is accustomed to. Additional fencing costs would likely be incurred, because yearlings cannot be controlled in an unfenced grazing area.

Disease control and prevention would also cost more. Foot rot, in particular, is more of a problem for yearlings. One rancher estimated that medical expenses for yearlings would be about $10 more per animal

compared to the medical cost of calves. However, costs associated with brucellosis testing and vaccination would be zero, and this would be a benefit.

In sum, conversion from a cow-calf to a steer or spayed heifer operation would cause fundamental changes in nearly all aspects of the operation, from marketing and risk management, to labor and management demands, to capital and noncapital expenses. As mentioned in the environmental impact statement, there would also be nonmonetary costs of conversion due to the personal satisfaction an operator may gain by raising calves. Compensation for conversion would need to recognize these intangible attributes of a cow-calf operation as well if voluntary conversion was to be accomplished.

Risk mitigation through voluntary conversion of cow-calf operations in the Yellowstone National Park vicinity to steer or spayed heifer enterprises could have major economic impacts on individual operators. However, all changes would be on a voluntary basis, and costs would be compensated.

Representative Comment: 100115D

Issue 3: ***Potential Consequences of Montana Losing Class-Free Status or of Sanctions Imposed by Other States***

A Comment: Need evidence that Montana would be adversely affected by loss of brucellosis-free status.

Response: Introduction

Economic impacts of brucellosis in cattle are summarized on pages 22, 25, and 26 of the *Draft Environmental Impact Statement*. As indicated, producers with herds directly affected would suffer production losses due to the disease, as well as disrupted incomes due to quarantine and probable depopulation.[1] Other Montana cattle producers could be indirectly affected by a change in the state's brucellosis status or by actions taken by other states even if Montana maintained its class-free status. On the supply side, brucellosis testing would mean increased costs for producers. On the demand side, any doubts in the minds of out-of-state buyers regarding the health of Montana's test-eligible cattle, notwithstanding their having been tested, could mean lower prices. Producers could lose sales if customers chose to purchase livestock from other states.

If all of Montana was reclassified as class A, estimated testing costs to producers would be between $5.1 million and $16.3 million per year. If the state acquired split-status, with most of Montana remaining class-free and only the affected area reclassified as class A, testing costs would total much less, depending on the area reclassified, but there would also be costs of maintaining split status. In either case, it would be at least a year before class-free status was regained, but probably not more than two to four years, depending upon how quickly all known foci of brucellosis in domestic herds were brought under control.

Potential price impacts are difficult to assess. If demand for Montana's test-eligible cattle dropped following the state's reclassification as class A, such that prices received fell by 1%–3%, the decrease in income for Montana's producers could reach from $4.7 million to $22.5 million per year. Naturally, if

1. The discovery of reactors in a producer's herd could be devastating. If the producer decided against depopulation, income losses would be prolonged by herd movement restrictions. If depopulation was chosen, indemnity payments would probably not fully compensate for lost productivity gains (lost future income) that may have required years of selective breeding and culling. Owners of herds approved for depopulation can choose between two methods of indemnification: a fixed-rate method and an appraisal method (9 CFR Part 51). Under the fixed-rate method, indemnity does not exceed $250 per animal for nonregistered cattle other than dairy cattle, and $750 per animal for registered beef cattle and nonregistered dairy cattle. By the second method, the producer is paid the appraised market value of the animal minus its salvage value, with appraisals conducted by an independent appraiser selected by APHIS.

class-free/class A split status was acquired, estimated price impacts would be proportionally smaller. In any case, the extent to which price impacts would occur is not known.

The last section of this response puts the estimated testing and price impacts in perspective. For the livestock industry statewide, the effects would apparently be far from crippling. For particular producers in areas reclassified as class A, however, testing costs and the potential fall in prices could have severe consequences, depending on each individual producer's financial circumstances.

Testing Impacts

Class-free and class A testing requirements[2]

Test-eligible cattle from certified brucellosis-free herds, regardless of the status of the state, may move without testing if the identity of the herd of origin is maintained. Test-eligible cattle moved interstate from a class-free state such as Montana do not require brucellosis testing, only certification that identifies them as originating in a class-free state.

Test-eligible cattle are all cattle 18 months of age and over, except steer, spayed heifers, official calfhood vaccinates of dairy breeds under 20 months of age, and official calfhood vaccinates of beef breeds under 24 months of age. An official calfhood vaccinate is a female that, as a calf, was inoculated subcutaneously with an approved *Brucella* vaccine between appropriate age limits by a state or federal representative or an accredited veterinarian using the approved vaccination procedure. Official calfhood vaccinates that are parturient or postparturient are test eligible regardless of age.

A change in the brucellosis status of a state from class-free to class A results in basically two testing impacts: a negative test becomes necessary for test-eligible cattle moved interstate, and testing requirements are increased for dairy herds in the state. In Montana dairy cows comprise only about 1.2% of Montana's cows (including heifers that have calved), and 98.8% are beef cows. The discussion, therefore, is directed to possible impacts for cattle moved out-of-state.[3]

For class A states, test-eligible cattle originating in nonquarantined herds may move interstate from a farm of origin directly to a farm of destination if they have a negative test within 30 days before interstate movement and are accompanied by a certificate. Cattle and bison may be moved interstate from a farm of origin without a certificate directly to a specifically approved stockyard for the required negative test. A certificate is required for those test-negative cattle that subsequently move interstate from a specifically approved stockyard. (A postmovement test at 45–120 days is strongly recommended.)

2. Regulations concerning interstate movement are found in 9 CFR 78, Subpart B. Minimum standards of the "Cooperative State-Federal Brucellosis Eradication Program" regarding movement of cattle within and from class-free states or areas and within and from class A states or areas, are found in chapter 2, parts II and III, of the *Brucellosis Eradication: Uniform Rules and Methods*, U.S. Department of Agriculture, APHIS.

3. For dairy herds, the brucellosis ring test must be conducted in a class A state or area at least four times per year at approximately 90-day intervals, with all herds producing milk for sale in the state required to be included in at least three of the four brucellosis ring tests conducted each year. For a class-free state, the level of brucellosis ring test surveillance is lowered to two brucellosis ring tests per year at approximately 6-month intervals, and each herd producing milk for sale in the state must be included in both tests. Thus, a change from class-free to class A status would mean that Montana's dairy producers would face added testing and handling costs associated with the higher level of brucellosis ring test surveillance. Given the very small number of dairy cows compared to beef cows in Montana (18,000 compared to 1,532,000 head) these costs are noted but are not included in the analysis.

To allow for ranching operations that regularly cross jurisdictional boundaries, an exception to class A testing is made under certain circumstances,[4] although as noted in the *Draft Environmental Impact Statement*, Idaho and Montana have their own testing agreement for Idaho cattle that are grazed in the Yellowstone National Park vicinity, even though both states are class-free.

For a state to acquire class-free status, all cattle herds in the state must remain free of field strain *Brucella abortus* for 12 consecutive months (9 CFR 78.1). In addition, the state must successfully complete epidemiologic investigations of at least 95% of the market cattle identification reactor cases traced to the farm of origin during the 12-month period. Adjacent herds and herds from which cattle were received by an affected herd must be placed under quarantine and have individual herd plans in effect within 15 days of locating the source herd or recipient herd. Thus, if Montana was reclassified class A, it would need to remain free for at least a year following successful elimination of the disease before it could regain class-free status. California is the one class-free state to date that was reclassified class A (for three years, from September 1994 to October 1997) and then regained class-free status.[5]

It is noted that a recent regulatory change enables a state to maintain its class-free status following the detection of an affected herd if the state meets certain conditions.[6] These conditions include quarantining, testing, and depopulating the affected herd and conducting an investigation to ensure that brucellosis has not spread. Provision of this option to states such as Montana will encourage the prompt resolution of any isolated cases of brucellosis, making the loss of class-free status less likely. However, a state may retain its status in this manner only once during any two-year period, and other states could still take action on their own.

Reclassification of Montana as Class A

Test-Eligible Cattle Moved to Other States. State of Montana statistics on out-of-state movement of cattle are not categorized by whether or not cattle are test-eligible. If the cattle are not purchased at a market in Montana, they are listed by the state, Canadian province, or country of destination, and grouped according to whether the animal is being moved to a feedlot, a change of pasture, an out-of-state market, or a slaughter plant. Out-of-state movements for 1997 from private sales (shown in table 3) totaled about 1.3 million head, with about 80% either going to feedlots or to a change of pasture.

Destinations of the 1.3 million Montana cattle moved out-of-state in 1997 following private transactions included 47 states, seven Canadian provinces, Argentina, and Mexico. A large proportion of the total number were moved to a relatively small number of states, with two-thirds of the 1.3 million head shipped to five states: Iowa, Kansas, Nebraska, South Dakota, and Wyoming. Ninety-five % of all privately transacted out-of-state movements are accounted for when shipments to Colorado, Idaho, Minnesota, North Dakota, and Washington are included as well. Presumably, a similar concentration of movement exists for cattle moved out-of-state following market transactions. Of these 10 states, only South Dakota is not class-free.

4. Testing requirements for interstate movement are not required if all of the following conditions apply:
The cattle or bison being moved are from a herd that is not known to be affected
The cattle or bison being moved have not changed ownership and are not changing ownership
The cattle or bison are from herds that have had a complete negative herd blood test within 12 months
Any cattle or bison that were added to the herd after the herd test were also tested negative
The cattle or bison being moved have not come in contact with cattle or bison not meeting these requirements.

5. Florida and Louisiana were both reclassified from class-free to class A in 1998 and have yet to regain class-free status.

6. *Federal Register*, March 31, 1999 (64, (61): 15,296–98).

TABLE 3: NUMBER AND PERCENTAGE OF MONTANA CATTLE PURCHASED OTHER THAN AT MARKETS AND MOVED OUT-OF-STATE, BY TYPE OF DESTINATION, 1997

	Head Count	Percentage
Feedlots	566,544	43.5
Out-of-state markets	159,820	12.3
Slaughter plants	98,745	7.5
TOTAL	1,303,538	100.0

Source: Montana Department of Livestock, Brands Enforcement, Annual Report to the Board of Livestock, 1997.

Test-eligible cattle are included in all of the destination categories shown for private transactions in table 3, but their numbers are not known. The out-of-state movement of steer and other cattle not test-eligible would not be affected by a change in Montana's status. For purposes of general approximation, it is assumed that from one-third to two-thirds of privately purchased cattle leaving Montana are test-eligible. They probably make up a majority of cattle destined for a change of pasture, but a much smaller share of those moved to feedlots. For the market and slaughter plant destinations, even general statements such as these about the proportion that are test-eligible cattle, are difficult. The one-third to two-thirds range is very broad, but nonetheless instructive as to the potential costs that Montana's producers could face.

In addition to the out-of-state movements shown in table 3, 454,662 head of Montana cattle purchased at markets in Montana in 1997 were also moved out-of-state. An estimated two-thirds of these cattle were test-eligible.[7]

Cattle moved to out-of-state slaughter plants are not included in the calculation of potential testing impacts. Test-eligible cattle from a class A state or area that are not brucellosis exposed and are from a herd not known to be affected may be moved interstate from a farm of origin to a recognized slaughtering establishment without restriction. Subtracting these cattle (7.5% or 98,745 head in table 3) from the total number moved out-of-state following private transactions yields 1,204,793 head. Assuming, similarly, that 7.5% of the 454,662 cattle purchased at markets and moved out-of-state were also destined for slaughter and, therefore, should be removed from the calculations, yields 420,562 head.

Annual testing costs, based on 1,625,355 (1,204,793 + 420,562) head of nonslaughter Montana cattle moved out-of-state, are calculated to range between $5.1 million and $16.3 million, assuming that (1) testing costs per head range from $7.50 to $15.00, (2) from one-third to two-thirds of nonslaughter cattle sold privately and moved out-of-state are test-eligible, and (3) two-thirds of nonslaughter cattle purchased at markets and moved out-of-state are test-eligible.[8] The $7.50 to $15.00 cost range is the same as was

7. Rob Tierney, Montana Department of Livestock, pers. comm.

8. One-third of 1,204,793 plus two-thirds of 420,562 multiplied by $7.50, equals $5,114,800. Two-thirds of 1,204,793 plus two-thirds of 420,562 multiplied by $15.00, equals $16,253,600.

assumed in the *Draft Environmental Impact Statement* and includes all veterinary and handling expenses. It is a cost borne entirely by the producer.[9]

In the past, individual states have imposed or threatened to impose testing requirements on breeding stock originating in Montana due to perceived risks, despite Montana's class-free status (see *Draft Environmental Impact Statement*, pp. 25–26). Potentially, some fraction of the $5.1 million to $16.3 million range of costs could be incurred by Montana producers, if other states decided that risks posed by cattle from Montana justified such action despite Montana's class-free status. The size of the impact would depend on which states sanctioned their own testing requirements, the portion of Montana test-eligible cattle moved to those states, and opportunities for those movements to be redirected elsewhere. Assuming the testing requirements of states would be no more stringent than those required of a class A state, the collective cost of testing imposed by individual states would not exceed the $5.1 million to $16.3 million range calculated above.

Test-Eligible Cattle Moved to Canada

Included in table 3 are 2,622 cattle moved to Canada (almost entirely split between feedlot and change of pasture destinations).[10] Certification requirements of Canada for breeding cattle exported from the United States may be summarized as follows:

origination from a certified brucellosis-free herd

origination from a class-free state

origination from a class A or B state, from an established herd in which no evidence of brucellosis has existed either clinically or serologically during the 24 months prior to export, or from an assembled herd with a complete herd test within 12 months, except animals under 6 months of age, spayed heifers, steer, and official vaccinates under 18 months of age, according to Canadian standards

Canada's definition of test-eligible cattle is similar to that of the United States.[11] A test is not required for steer, spayed heifers, or official calfhood vaccinates under 18 months of age. However, Canada accepts

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9. In past rule changes reclassifying the brucellosis status of states, a testing cost of $4.00 per head has been assumed in APHIS analyses of impacts on producers. This amount may be a reasonable estimate of veterinary fees for administering the test, but it does not take into account handling costs that would also be incurred. These costs vary considerably, depending on the labor and equipment available to a producer. In the extreme case, portable corrals may be required and labor may be hired to gather and work the cattle. There are also hidden costs, such as the stress caused to the cattle tested. A range of $7.50 to $15.00 per tested animal is, therefore, considered a realistic approximation. (Mr. James Peterson, Montana Stockgrowers Association, and Dr. Thomas Linfield, Montana Department of Livestock, pers. comm.)

10. Movement of 23 head to Argentina and 62 head to Mexico was also recorded.

11. Negative testing requirements for breeding cattle exported to Canada from class-free and class A or B states depend on the status of the herd and state.

Certified brucellosis-free herd, regardless of the status of the state:
One standard tube test or standard plate test on exported animals within 30 days prior to export.

Class-free states:

Established herd: One standard tube test or standard plate test on exported animals within 30 days prior to export.

Assembled herd: Two standard tube test or standard plate test on exported animals at least 30 days apart. The second test must be conducted within 30 days prior to export.

Class A and B states:

only animals vaccinated with strain 19 as official calfhood vaccinates, and all original calfhood vaccinates in Montana are vaccinated with RB51. Therefore, they are tested as well.

The additional testing requirements for Montana producers exporting breeding cattle to Canada, if Montana was reclassified as class A, would be for (1) established herds, the additional testing of cattle introduced into the original herd, and (2) assembled herds, an initial, complete herd test (not only the cattle being exported). The impact, therefore, would depend on whether movement was from established or assembled herds. Given the very small number of cattle exported to Canada (0.2 % of all cattle moved out-of-state), the overall impact on Montana's producers would not be major.

Split Class-Free/Class A Status

If brucellosis infection of cattle herds in the Yellowstone National Park vicinity necessitated reclassification, it is possible that not all of Montana would need to be reclassified as class A. APHIS may approve a state's division into two classification areas upon finding that the state has legislative and regulatory authority for maintaining separate areas; the state has committed resources to enforcing the different requirements in each area; the state has an effective method for monitoring and controlling movement of cattle across the intrastate boundary; the state has defined the intrastate boundary by county lines or by recognizable geographic features, such as rivers and highways; and each area of the state meets the standards for the brucellosis classification requested.[12]

If one or more affected cattle herds in the Yellowstone National Park vicinity resulted in conditions requiring reclassification from class-free status to class A status, Montana's fulfillment of the requirements stated above could allow reclassification to be restricted to the affected area. Dividing Montana into two areas of classification would significantly reduce total potential costs. As a hypothetical example, if Gallatin and Park counties were to comprise the area reclassified as class A and assumptions regarding out-of-state sales of test-eligible cattle matched those assumed for Montana as a whole, then estimated testing costs would range from $168,800 to $536,400 per year.[13] If the area reclassified as class A was restricted to that corresponding to the SMAs for alternative 2 in the *Draft Environmental Impact Statement*, estimated testing costs for affected producers could total between $7,500 to $15,000 per year, or even as little as $2,500 to $5,000 per year, if only areas in which bison normally move when outside Yellowstone National Park were reclassified.[14]

Established herd: One standard tube tests or standard plate tests within 30 days prior to export. (All additions to the herd, except natural increases, must be tested at least 60 days prior to the qualifying test for export.)

Assembled herd: One standard tube test or standard plate test on the complete herd within 12 months of export except for calves under 6 months of age. One standard tube test or standard plate test on individual animals being exported regardless of age except for calves born after any testing commences. The second test must be conducted at least 60 days after the complete herd test but within 30 days prior to export.

12. 9 CFR 78.40.

13. Cattle and calves sold by producers in Gallatin and Park Counties in 1997 totaled 54,630 head (28,278 and 26,352 head, respectively), which represented 3.3% of Montana's cattle and calf sales (1,654,014 head) (1977 Census of Agriculture, vol. 1, part 26, table 14). Assuming the same proportion of cattle moved out-of-state from the two counties are test-eligible, as is assumed for the state as a whole, then testing costs would range from $0.033 \times \$5,114,800 = \$168,800$ to $0.033 \times \$16,253,600 = \$536,400$.

14. Given that 80% to 90% of the cattle grazed in the West Yellowstone area are already tested yearly due to seasonal movements to and from Idaho, testing required because of class A classification could affect cattle moved out-of-state from herds having a combined inventory of roughly 1,000 cow-calf pairs. Assuming, as an upper bound, that all of these cows are moved out-of-state, the total testing cost would range from $7,500 to $15,000 per year. Only about one-third of these 1,000 cow-calf pairs on the north side of Yellowstone National Park are in areas normally traversed by bison when they move off

The feasibility of any of these divisions would depend on Montana ensuring a secure boundary between the areas. In the past Florida has been split into class B and class C areas, and subsequently into class A and class B areas. There has not been an instance when a state has been split into class-free and class A areas. Division would enable the majority of Montana cattle producers to continue to operate under class-free conditions. While the state would bear area surveillance and enforcement costs of maintaining split status, these costs would presumably be less than those that would be borne by Montana producers if the whole state were reclassified as class A.

In Florida's experiences with split status, the division between the two areas gradually shifted southward, as herds met conditions for reclassification and the more restricted area progressively diminished in size. The cost to Florida of maintaining split status, including expenditures on inspection stations and other surveillance measures, cannot be separated from other federal and state cooperative brucellosis program costs that were incurred. Even if it were possible to do so, costs for Montana would depend on its own circumstances — the area reclassified as class A, construction and staffing of inspection stations, and other surveillance activities for monitoring and controlling the movement of cattle.

Price Impacts

Brucellosis testing, as described above, would permit Montana's producers to market test-negative breeding stock out-of-state. However, there could still be out-of-state buyers who would not perceive the cattle as brucellosis risk-free, and this doubt would be reflected in the prices they would be willing to pay for Montana breeding stock.

The extent to which out-of-state demand would contract cannot be readily estimated. To exemplify the potential size of the impact, a decrease in demand that would result in a 1%–3% decline in prices paid for Montana cows and heifers is assumed.

The average value of Montana cattle between 1989 and 1998 was $691 per head.[15] A 1% decline in price, then, would mean a decrease of $6.91, and a 3% decline would mean a decrease of $20.73. Using these price discounts, the annual price impact for Montana producers would range from $4.7 million to $22.5 million, assuming 1,204,793 head as the number of privately purchased cattle moved out-of-state other than to slaughter with one-third to two-thirds as the proportion of those that are test-eligible, and 420,562 as the number of head purchased at markets and moved out-of-state other than to slaughter, with two-thirds as the proportion of those that are test-eligible.[16]

Under split-status, if only Gallatin and Park counties were reclassified as class A, annual price effects could range from $155,500 to $741,300. In the more restrictive examples, annual price effects could range from $7,000 to $21,000, if the reclassified area corresponded to the alternative 2 SMAs in the *Draft Environmental Impact Statement*, or as little as $2,300 to $7,000, if only the area where Yellowstone National Park bison normally move when outside the park was reclassified as class A.[17]

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the park, implying that testing costs for a very geographically restricted class A area could total from about $2,500 to $5,000 per year. In all cases, there would be additional costs of monitoring and controlling movement of cattle across the intrastate boundary.

15. Calculated from values shown in Montana Agricultural Statistics 1998, p. 82.

16. One-third of 1,204,793 plus two-thirds of 420,562 × $6.91 = $4,712,400. Two-thirds of 1,204,793 + two-thirds of 420,562 × $20.73, = $22,462,400.

17. Assuming the same proportion of cattle moved out-of-state from the two counties are test-eligible, as assumed for the state as a whole, a 1%–3% drop in prices paid for cattle moved out-of-state from the two counties due to reduced demand would mean an annual price impact ranging from 0.033 × $4,712,400 = $155,510 to 0.033 × $22,462,427 = $741,260.

It is emphasized these costs are only illustrative. The degree to which demand for test-eligible cattle from Montana would be affected by the loss of its class-free status or by sanctions imposed by individual states is not known. To determine a price effect econometrically would be extremely difficult because of the many variables affecting cattle prices and the lack of interstate movement data specifically for test-eligible cattle.[18] Possible analyses might seek to determine whether there were price impacts for California producers during the three years after losing and before regaining class-free status, or might compare prices paid for test-eligible cattle moved from the six class A states to prices received by producers in the 44 class-free states.[19] In either case, information on the number of cattle affected and the prices paid for them is not available. Price data on cattle moved interstate do not distinguish between test-eligible and nontest-eligible cattle; only cattle inventory data are categorized that way. Even if the number of cattle of concern could be determined, the many factors affecting cattle prices, temporally and spatially, would make it very unlikely that the impact of class A status on prices could be specified with confidence.

Personal experiences of livestock producers offer some insight into the impact on demand of loss of class-free status, but it is difficult to generalize from their individual observations. A cattleman in Florida, for example, noted that, all things equal, buyers will make purchases from a class-free area rather than a class A area, mainly because of the additional paperwork requirements or other regulatory inconveniences associated with a class A purchase. The inclination to purchase from a class-free area would presumably be greater than from the class A area. Another Florida cattleman did not think that the change in Florida's status from class-free to class A had resulted in any shift in demand, especially since nearly all of the herds are certified brucellosis free and the state is in the process of regaining class-free status. With respect to the three-year period, September 1994 to October 1997, when California was class A, one individual familiar with that state's cattle markets thought that the change in status probably caused little noticeable effect on demand by other states for California's test-eligible beef cattle. He suggested one possible reason was that the affected cattle were dairy cows in a part of the state well removed from major beef cattle producing areas. On the other hand, this same individual thought that if a neighboring state, such as Nevada or Arizona, was to be reclassified class A, demand by California buyers for its test-eligible cattle would be affected.

These informed opinions suggest that out-of-state movement of test-eligible cattle from California and Florida was not greatly affected by the states' loss of class-free status. While buyers may be disinclined from purchasing test-eligible cattle from a class A state or area, the circumstances of each transaction — such as the proximity of affected herds to the herd from which cattle would be purchased, whether or not the herd from which the cattle would be purchased is certified, or the relative prices and other advantages and disadvantages of purchasing from alternative sources — may support or lessen this disinclination. In sum, the impact on demand if Montana or an area within Montana lost class-free status is far from certain.

Putting the Impacts in Perspective

Impacts for Montana producers of losing class-free status may appear to be of greater or lesser significance, depending on one's point of reference and assumptions about the extent of reclassification.

Assuming 1,000 cow-calf pairs would be affected by reclassification of the Yellowstone National Park vicinity that corresponds to the alternative 2 SMAs (since most of the cattle in West Yellowstone are tested annually when moved from Idaho), the 1%–3% decrease in prices received would mean a loss in annual income ranging from $6,910 to $20,730 (1,000 × 0.01 × $691 and 1,000 × 0.03 × $691). Annual income losses would be approximately one-third of this cost range, namely, $2,300 to $7,000, if only areas usually occupied by Yellowstone National Park bison when they are outside park boundaries were reclassified.

18. Aubrey Bordelon and Greg Thessen, livestock specialists with NASS, and Mark Ashcraft, California Department of Food and Agriculture, Animal Health, pers. comm.

19. The six class A states are Florida, Louisiana, Missouri, Oklahoma, South Dakota, and Texas.

From the perspective of Montana's cattle industry overall, the effects may be considered manageable, whereas for an affected producer the consequences could be extreme.

If Montana was reclassified to class A and a decrease in out-of-state demand for its test-eligible cattle caused a decline in price by 1% to 3 %, the combined impact is estimated to range from $9.8 million to $38.8 million per year. In 1997, cash receipts of Montana producers of cattle and calves totaled $865.7 million,[20] so the estimated impact ranges from 1.1 % to 4.5 % of gross income when averaged over all sales by all producers. The average impact would be greater if only affected producers are considered, that is, those producers that move test-eligible cattle out-of-state. However, the 1.1 % to 4.5 % range is a fair approximation, since most of Montana's cattle are sold interstate.

If affected herds in the Yellowstone vicinity led to Montana acquiring split class-free/class A status and other states recognized the split status, then the impact statewide for Montana producers would be appreciably smaller. Assuming only Gallatin and Park counties were reclassified, for example, the testing and demand impacts are estimated to total from $324,300 to $1,277,700 per year, which represents only 0.04% to 0.15% of cattle and calf cash receipts statewide.[21] Naturally, the statewide impact would be even smaller if the class A reclassification was restricted only to the Yellowstone National Park vicinity.

These hypothetical reclassifications include a price impact of approximately the same magnitude as the cost of testing. The extent to which price impacts would occur is not known, and if they did not reach the 1%–3% level assumed, impacts described above in relation to statewide cattle and calf cash receipts are overstated.

An individual producer in the state or in an area of the state reclassified as class A could have a very different point of view. Depending on his particular circumstances, testing costs and price effects could significantly affect his/her net returns. An analysis of costs and returns to cow-calf enterprises in Montana offers insight.[22] The study was designed to provide both production and financial performance characteristics for Montana livestock producers. Using an approach called standardized performance analysis, 31 commercial cow-calf operations were analyzed. The operations were not selected randomly, but they do portray a cross-section of the cattle industry in Montana. Average investment per breeding cow, for example, based on costs actually incurred, was found to range from about $342 to $6,083. The overall average for the 31 producers was $1,737 per breeding cow.

The study found that the financial net pretax income per cow, after withdrawals, ranged from a minimum of a negative $538 to a positive $134, with an average of a negative $35. The same values, in economic terms, ranged from a negative $538 to a positive $83, and the average pretax income was a negative $108. Economic costs include the financial costs (out-of-pocket costs, depreciation, and interest expenses), plus the opportunity cost for owned land, raised feed, and equity capital.[23] When economic net returns are negative, owned resources are not receiving their opportunity value (i.e., land is not earning its cash lease rate).

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20. U.S. Department of Agriculture, NASS, Montana State statistics.

21. Based on testing costs for the two counties ranging from $168,800 to $536,400 and price impacts ranging from $155,500 to $741,300.

22. Duane Griffith, "Comparative Analysis: Measuring Beef Production and Financial Performance with SPA," Montana State University (last updated 3/6/97).

23. The opportunity cost of the owned grazing land is the lease equivalent the land could be rented for if it were rented out for grazing to others. The opportunity cost of the raised feed land (and raised feed) is the net market value of the raised feed that is fed to the cow-calf enterprise. The opportunity cost of the remaining equity capital is the equity position times the real rate of interest.

The analysis highlights the fact that costs of testing and potential price declines due to reclassification could be the difference between a positive and negative net return for an operation, since a cattle producer's profit margin may be extremely narrow. Impacts that do not appear to be devastating on a statewide level could, in fact, be just that for an individual producer, depending on his particular circumstances.

Finally, in considering impacts from both statewide and producer perspectives, the likely length of time a class A reclassification would last should be kept in mind. The regulatory requirements for regaining class-free status, together with California's experience, would suggest that class A reclassification of all or part of Montana would probably last for a handful of years — more than a year, but not long into the distant future.

Representative Comment: 14714N

Issue 4: ***Impact of Eliminating Cattle Grazing on Forest Service Allotments***

A Comment: Fully consider and document all economic impacts, including the cost of the program to all agencies and industries, and thoroughly compare those costs to the potential economic risks to local ranchers, including but not limited to, revocation of public lands grazing leases in areas with brucellosis infected wildlife.

Response: Program costs of the alternatives are shown in tables 46 and 47 of the *Draft Environmental Impact Statement* and are discussed on pages 259–63. Because the risk of brucellosis transmission from Yellowstone National Park bison is not quantified, potential costs to local ranchers is stated in terms of the value of public grazing resources eliminated under the various alternatives. As stated on page 262, costs associated with property damage by bison and possible changes in testing and vaccinating practices are not included in the tables. The legal basis for closing grazing allotments is addressed in this volume under "Livestock Operations: Public Grazing Allotments — Modify," issue 1A, and possible compensation to permittees under the same topic issue 1F. Closure of allotments would mean that the affected producers would need to find alternative grazing. Assuming alternative grazing was available, we can assume that private grazing fees would be charged, which in 1997 averaged $12.30 per animal unit month, compared to an allotment fee of $1.35 per animal unit month.[24] Within this apparent discrepancy between private and public leasing fees, however, are a number of hidden expenses incurred by the allotment permittee that make the actual costs of public grazing equal to, if not greater than, grazing on private land.[25] Thus, it would be misleading to suggest that the difference in leasing fees accurately portrays actual cost differences. Costs would be borne, however, in the initial search for alternative grazing and in the form of transaction costs over and above any that would have been incurred by a permittee. These costs would depend on the scarcity of grazing resources in the area, and a producer's flexibility as far as the leased property's location and facilities. Specific cost changes would depend on the adjustments in transport, labor, and equipment made by an affected producer.

Representative Comment: 15874AHH

24. Source for the private grazing rate, Montana Agricultural Statistics 1998, p.85. Source for the grazing allotment rate, U.S. Forest Service.

25. On privately leased land, cattle are generally delivered in the spring and picked up in the fall, with the lease fee paying for a number of services, such as maintenance of water troughs and fences. Such services a permitee has to provide for himself on a grazing allotment. Also, among the less apparent costs incurred by a producer on a public grazing allotment are various regulatory requirements. For example, on private or state land, a producer can kill a wolf if it is caught in the act of "killing, wounding, or biting" his livestock; on a federal grazing allotment, procedures would need to be followed that could delay immediate protection of the herd. Other regulatory aspects of public grazing can be very time consuming, and therefore costly, such as participation in NEPA activities.

Issue 5: ***Effects of Alternative 2 on Ranchers***

A Comment: In order to better understand the possible effects of alternative 2 on the lifestyles of individual ranchers, the environmental impact statement has to state:

how many have ownership interests in the affected land

how many have leasehold interests

what is the acreage of each of these ranches and the total acreage involved

which of these are individual ranchers and which are corporate entities

how many and which of these are already involved in other ranching operations such as raising heifers

how many are engaged in other agricultural and other economic activities

how many have already disposed of part of their property for nonranch uses, such as for residential/recreational activities

Response: Most of these questions are of a personal nature, and answering them would lend undue attention to the affected producer's private circumstances, rather than providing a better understanding of the potential effects of alternative 2. Information has not been collected on the number of privately owned and leased properties, their acreages, their corporate status, their nonranch activities, or the disposition of property for nonranch purposes. As far as the grazing allotments are concerned, 2 of the 12 potentially affected by bison management — Slip-and-Slide and Horse Butte — have horses on them as well as cattle. All other operations on these allotments are cow-calf.

Representative Comment: 14209AA

Minority and Low Income Populations (SO-39)

Issue 1: ***Impacts on Native Americans***

A Comment: Commenters wanted Native Americans to receive live bison to repopulate herds, thereby providing income to economically disadvantaged tribes.

Response: Several of the alternatives in the environmental impact statement include this scenario. Alternatives 3, 7, and the modified preferred alternative include a quarantine facility, which could provide tribes with a source of live bison.

Representative Comment: 5583B

B Comment: Commenters expressed support for Native American involvement in bison management as part of a "special management agency" effort. Not only should the state of Montana, the U.S. Forest Service, APHIS, and the National Park Service be involved in making decisions regarding bison, but Native American representation should also be included.

Response: Agencies that participate in the decision-making process on bison management incur ongoing costs associated with that involvement. Depending on the level of involvement of the agency, these costs involve everything from staff time and costs associated with attending meetings on bison management issues, to supporting the direct costs of the physical aspects of bison management. Gallatin National Forest personnel estimate that the U.S. Forest Service expends in excess of $100,000 per year associated with its bison management actions (*Bozeman Daily Chronicle)*. The costs of participation by tribes in bison management may not be this large, but some costs would be incurred. Tribes continue to give valuable input to the agencies in the process of government-to-government consultations on bison management issues. This will continue during and well beyond the bison planning effort.

Representative Comment: 11409aT

C Comment: Commenters disputed the DEIS findings that the potential distribution of 720 bison carcasses over the next four years would have a negligible impact on tribes. Any distribution of carcasses has a potentially significant impact to tribes if these carcasses are not made available to them. The environmental impact statement should acknowledge the context when deriving an impact conclusion. Tribes and tribal people in Montana are living well below the poverty level and have significantly high levels of unemployment. Therefore, tribes that receive carcasses will experience major benefits as opposed to carcasses being sold by the state to offset the state's cost of bison transport to slaughter.

Response: Alternative 5 would make available an estimated 1,278 bison carcasses over four years to Indian tribes and charitable organizations. Based on past distribution patterns for carcasses, 720 of these bison would be distributed to tribal members. Given the generally disadvantaged economic status of Indian tribes in Montana (see volume 1, "Affected Environment: Socioeconomics"), the significant distribution of food that these 720 large animal carcasses would represent would have a significant positive impact on tribal members in the short term. In the longer term, however, the distribution of meat and hides over a four-year period would not likely significantly impact the economic status of tribes in the state.

Representative Comment: 11409T

D Comment: Some tribes want the environmental impact statement to acknowledge the expenditure of their funds to travel to Yellowstone National Park or a slaughterhouse to retrieve carcasses. It is unfair, according to commenters, to acknowledge that the state has costs to recover, yet not also present the fact that the tribes also have costs. This is especially true of those tribal members who drive with their families long distances, pay for accommodations and meals while on the road, pay for tanning and meat processing, etc.

Response: There can be significant costs associated with retrieval, transportation, and processing of bison carcasses by tribal members. Factors that might influence the direct out-of-pocket costs associated with bison retrieval and processing are distance traveled to the park and whether the tribal members butcher the meat and process the hides themselves or pay for a professional to do it. For tribal members coming to the Yellowstone area from more distant states or reservations, retrieval costs could be substantial.

The auction-based estimate of the value of a bison carcass used in the *Draft Environmental Impact Statement* ($337) is by definition "net of costs" because it is the cost FOB at the auction site. That is, this auction value was arrived at by bidders who were taking into consideration the additional costs they had incurred and would incur in transporting and processing the carcasses. To the extent that the costs faced by tribal members are greater than those faced by the average successful bidders at the bison auctions, the $337 carcass value used in the *Draft Environmental Impact Statement* would overstate the value of the carcasses retrieved by tribal members.

Representative Comment: 11409aT

E Comment: The *Draft Environmental Impact Statement* provides an analysis of direct and indirect economic impacts to livestock operators, but does not even attempt to project these types of impacts to tribes. Instead, the agencies ask that the tribes themselves present an analysis of impacts to be incorporated into the final environmental impact statement (DEIS p. 300). The Nez Perce Tribe and others suggest that governmental incentives and compensation be given to each of the enrolled members of the tribe to help adjust for the lost opportunities of not having bison (live animals to export to the reservation, the abundance of animals enjoyed in the park, the loss of meat and hides, the loss of jobs that could be created if Yellowstone National Park bison were given to tribes, etc.) and the related cultural strife that the associated loss of bison would cause these tribal members. The InterTribal Bison Cooperative should be consulted on the current prices live animals are yielding at auction, and this should be used to calculate lost opportunity costs for tribes not able to receive live animals from Yellowstone National Park.

Response: A discussion of the potential for lost opportunity costs for tribes not able to receive live animals from Yellowstone National Park must be predicated by defining the status quo regarding live bison transfer to the tribes. Currently, there are no live bison being transferred from Yellowstone National Park to any Indian tribe. The future inability of Indian tribes to receive live bison would simply continue the current condition. A continuation of the status quo regarding live bison transfers would not be associated with a change in the socioeconomic position of the tribes or tribal members.

When socioeconomic impacts to other groups were estimated and discussed in the *Draft Environmental Impact Statement*, the status quo was also considered. For example, changes to current Greater Yellowstone Area grazing practices would represent a change from the status quo, as would significant reductions in viewing opportunities for Yellowstone National Park visitors.

Representative Comment: 11409aLL and GG, 14819AB

F Comment: The *Draft Environmental Impact Statement* did not assess the impact to minority and low income populations (particularly Native Americans) from the continued lethal means to address brucellosis in bison. The use of lethal force is a significant impact to the tribes' cultural well-being.

Response: During 1999 both visitors to Yellowstone National Park and regional and national populations were surveyed as to their attitudes on various issues associated with bison and brucellosis management. An examination of the responses to surveys of winter and summer park visitors, and a national random phone survey, indicate that Native Americans do indeed have differing attitudes towards the issue of bison management than do the average park visitor or national survey respondent. On the key question of lethal control of bison, survey respondents were asked whether they agreed or disagreed with the following statement: "It is appropriate to kill bison at park boundaries, as necessary, to protect domestic livestock." A significantly greater number of the Native American respondents (60% to 70%) disagreed with this statement compared with the average nonresident respondent in both the summer visitor survey (35%) and

the national phone survey (33%). The difference in attitudes towards lethal control of bison between the Native American and nonnative populations indicates that continued use of lethal control methods could have a greater negative impact on the well-being of tribes than the non-tribal population.

Representative Comment: 14356D

G Comment: Commenters were particularly concerned that there is no quantification in the *Draft Environmental Impact Statement* of the loss of jobs to Native Americans from the state's continued killing of seronegative bison. Commenters want a value assessed for this action compared to providing live bison to tribes (creation of jobs) or providing tribes directly with carcasses, compared to the state receiving the income from auctions/sales.

Response: The net economic value to tribes of receiving live bison from Yellowstone National Park may be difficult to compute, but it should be no higher than the lowest cost of obtaining live bison from alternative sources for the tribes. This cost is the market cost of live bison, which is currently an average of $1,700 per animal (1998 Custer State Park Bison Auction results).

The issue remains regarding which settings and alternatives this applies to. Impacts are estimated as changes relative to the status quo. The status quo is given by alternative 1, which does not provide for quarantine, but only for the distribution of carcasses. For alternatives that include or derive the number of carcasses distributed to tribes relative to alternative 1, the change in the number of carcasses is valued at the carcass auction value (with any possible adjustments for travel cost, see response to issue 1D). Only in alternatives that provide for quarantine (i.e., 3, 4, 7, and the modified preferred alternative) are any live bison going to be available to tribes — and at a substantial cost (see response to issue 1A). Providing live bison to tribes, rather than carcasses, does have a net economic benefit — the difference between carcass auction value and live auction value. The live bison auction prices incorporate the present discounted value of the bison as future breeding stock, etc.

The alternatives, including quarantine, could provide a stimulus of jobs but not a loss of jobs to tribes, relative to the status quo. Accurately computing the net jobs associated with the transfer of live bison would require a regional economic model of the tribe. As a rough estimate assume that the difference in the value of live bison vs. carcasses is a savings to the tribe and offsets an expenditure that would not stay in the tribe's area of residence, and this averted expenditure loss is equal to (live auction value — carcass value) times the number of bison. For a state like Montana, an averted expenditure loss of approximately $20,000 is necessary to support one job. Therefore, a transfer of at least 15 live bison per year would be needed to support one job, based on these averted cost calculations. It must be noted that the calculations above are approximate. In order to accurately estimate such a job impact, the data and analysis would need to be specific to the tribe receiving the bison and its local economy.

Representative Comment: 15363H, 17725I

Nonmarket Values (SO-40)

Issue 1: ***Economic Value of Cattle vs. Bison***

A Comment: Cattle have an economic value to livestock producers, local, regional, and state economies. There should be an assessment of the economic value of bison, and that this value should also be considered in selecting a final bison management plan.

Response: The final environmental impact statement contains survey-based information on the value people place on bison in Yellowstone National Park, based on responses to three 1999 surveys of Yellowstone National Park visitors and regional and national residents.

Even though wildlife viewing is the single most common activity engaged in by summer visitors to Yellowstone National Park, the issue of whether the bison population reductions described in the environmental impact statement would lead to measurable reductions in how visitors to the park value their visits is not clear. Responses to a 1999 summer survey of park visitors did not show any systematic relationship between the number of bison seen by visitors on their trips and the value they ascribed to their trip. The lack of such a statistical relationship is likely due to the fact that nearly all (97%) summer visitors responding to the survey had seen bison on their trips. In addition, most visitors had seen a relatively large number of bison. The bison population last summer was around 2,500.

While marginal changes in the number of bison in the park may not be associated with changes in visitor trip values, a significant number of respondents to the summer and winter visitor surveys indicated that seeing bison was one of their reasons for visiting the Greater Yellowstone Area. Among park visitors in both the summer and winter surveys, about 50% said that seeing bison was a reason for their trip (48.9% of resident summer visitors, 52% of nonresident summer visitors, and 53.9% of winter visitors). Additionally, a portion of these respondents said that they would not have made their trip to the park if bison had not been present. Overall, 5% of resident summer visitors and 3.6% of nonresident summer visitors said they would not have come to the park in the absence of bison. In the winter survey, 6.6% of park visitors said they would not have made the trip if bison had not been present in the park.

This new survey-based data on the relationship between bison presence and abundance and visitor trip values is incorporated in the final environmental impact statement.

Representative Comment: Form 25, L 555K, 759A, 10225B, 10338D, 11121W

B Comment: The nonmarket value of cattle should also be analyzed. While the *Draft Environmental Impact Statement* considered the importance of bison as a national symbol and the nonmarket value of bison, some commenters felt that the document downplayed the nonmarket value of cattle and agricultural lifestyles and culture.

Response: While there may be some nonmarket value associated with the ranching lifestyle in the Greater Yellowstone Area, there are certain stark contrasts between the Yellowstone bison herd and the cattle operations potentially affected by bison management actions. The herd is the only free-ranging bison herd in the U.S., and it is the most genetically diverse herd in the U.S. The Yellowstone National Park bison herd is rare and unique and is highly valued by many, both within and outside of the area. Cattle operations in the affected area, on the other hand, are not rare or unique. Cattle ranches and the agricultural lifestyle are found throughout many parts of the country. Moreover, cattle are a commodity that can be replaced at market price. The discussion of costs and benefits of bison and cattle in the *Draft Environmental Impact Statement* was not meant to downplay any costs or potential losses to cattle producers or the ranching lifestyle, but rather reflected the fact that things that are rare are valued more highly than those that are common.

Representative Comment: 1405U

C Comment: The *Draft Environmental Impact Statement* did not fully assess the full economic, social, cultural, and nonmarket impacts of loss of grazing lands through conversion of those lands to development. Some commenters felt that the threat of sanctions or loss of class-free status would put livestock operators out of business and lead to the selling of private lands to developers. This land conversion from agricultural to developed, subdivided lands would have significant environmental and socioeconomic consequences.

Response: All of the alternatives considered in the environmental impact statement were designed specifically to maintain class-free status. Absent the loss of class-free status, impacts from bison management actions on livestock prices in the state of Montana would likely be very minimal to nonexistent. Any decisions to subdivide ranch land would be much more greatly influenced by general livestock commodity prices, land prices, and other nonbison-related factors.

Representative Comment: 14305U

Issue 2: ***Value of Bison to Local, Regional, and State Economies***

A Comment: The economic benefits of maintaining a wild, free-ranging bison herd should be further evaluated. The bison is a particularly important component attracting visitors to the park and hence creating economic benefits to local, regional, and state economies.

Response: A significant number of respondents to the 1999 summer and winter Yellowstone National Park visitor survey, indicated that seeing bison was one of their reasons for visiting the Greater Yellowstone Area. Among park visitors in both the summer and winter surveys, about 50% said seeing bison was a reason for their trip (48.9% of resident summer visitors, 52% of nonresident summer visitors, and 53.9% of winter visitors). Additionally, a portion of these respondents said that they would not have made their trip to the park if bison had not been present. Overall, 5% of resident summer visitors and 3.6% of nonresident summer visitors said they would not have come to the park in the absence of bison. In the winter survey, 6.6% of park visitors said they would not have made the trip if bison had not been present in the park.

This new survey-based information on the role of bison as an attraction to visitors to Yellowstone National Park is presented in this final environmental impact statement (see volume 1, "Environmental Consequences: Impacts to Socioeconomics").

Representative Comment: 35544C, 5854I, 8646D

Issue 3: ***Value of Bison to the Overall Visitor Experience in Yellowstone***

A Comment: The value of bison to those visiting the park were either overstated or understated. Some commenters felt the environmental impact statement did not fully address the benefits of bison to wildlife viewing opportunities and recreation. Others felt that, based upon data used in the *Draft Environmental Impact Statement*, the reduction of the bison herd would not appreciably affect visitors, visitation, viewing, or recreational opportunities.

Response: Additional information on the relationships between bison numbers and viewing and visitors to Yellowstone National Park is included in the final environmental impact statement. An overview of this new information is presented in the responses to issues 1 and 2 under this topic.

Representative Comment: 14305U, 14700T

B Comment: Commenters supporting alternative 7 stated it was the best alternative because it would not adversely impact those who visited Yellowstone National Park to snowmobile. The *Draft Environmental Impact Statement* needed to weigh the value of opportunities to snowmobilers vs. the value of bison for viewing and examine other options besides closing snowmobile trails.

Response: Results from the 1999 surveys of Yellowstone National Park visitors, as well as regional and national residents, indicated that closing snowmobile trails in the park could have a larger negative regional economic impact than not closing trails. Survey results indicate that within the relatively narrow range of bison populations presented in the *Draft Environmental Impact Statement* alternatives, visitation to the park in the summer would not likely be significantly impacted by fluctuating bison populations, while winter road plowing would likely impact the decision of some snowmobilers to visit the park or the surrounding area.

Consistent with the impact of closing winter snowmobile trails within the park are the responses of winter visitors to the following visitor survey question: "If roads were not groomed, more bison might remain in the park. Given this possibility, which of the following policies would you prefer?" A majority (52.1%) of winter park visitors favored the current policy that allows for winter access; 23% favored closing winter access; and 25% were not sure which policy to prefer. Among summer park visitors who were asked this question, an equal proportion (37.4%) favored both closing winter access to the park and the current access policy. Among nonresident summer visitors, 34.6% preferred closing winter access, 25% preferred the current winter access policy, and 40.3% were not sure which policy to prefer.

This survey data is detailed in the final environmental impact statement (see volume 1, "Environmental Consequences: Impacts to Socioeconomics").

Representative Comment: 14501B, 10353A

C Comment: Some commenters expressed strong opinions and preferences for closing snowmobile trails as a nonlethal method to control bison population and movement. These commenters felt that the well-being of bison should take precedence over the recreational use of snowmobiles in Yellowstone National Park.

Response: The data available from the 1999 Yellowstone National Park visitor surveys, which is outlined in the above response to issue 3, is included in the final environmental impact statement. In addition to the results presented in response 3B, the 1999 surveys collected both visitor and resident responses to two statements on winter access and its relation to bison and other wildlife within the park. A majority of local (Greater Yellowstone Area), three-state region, and national respondents to a random phone survey agreed with the statement, "I am concerned about the possible disturbance of Yellowstone National Park wildlife in the winter" (62.4%, 67.6%, and 77.4% respectively). However, a majority of local (63.7%) and regional (63.1%) respondents, along with 49% of national respondents, also agreed with the statement, "Visitors should have the opportunity to have mechanized winter access to Yellowstone National Park."

Representative Comment: 14548D

Issue 4: ***Inadequate Analysis of Nonmarket and Existence Values***

A Comment: The *Draft Environmental Impact Statement* analysis of nonmarket values was inaccurate because the range of values presented was too broad to be meaningful.

Response: The 1999 Yellowstone National Park summer and winter visitor surveys, along with a regional and national phone survey gathered original information on nonmarket values relating to both use and existence values associated with Yellowstone National Park bison. This information and the nonmarket value estimated derived from it are presented in the final environmental impact statement. While there is still a large degree of uncertainty associated with existence values regarding Yellowstone National Park bison, the revised estimates offer an improvement over the literature-based estimates presented in the *Draft Environmental Impact Statement*.

Representative Comment: 14714NN, 14878F, 14886I

B Comment: The environmental impact statement must provide an analysis of benefits of a disease-free bison herd. Some commenters requested an analysis of viewing a disease-free bison herd or the benefits derived from knowing the herd is disease-free.

Response: The 1999 Yellowstone National Park visitor, regional, and national surveys collected the information necessary to derive estimates of two distinct existence values associated with Yellowstone National Park area bison. Approximately one-half of the survey respondents were asked questions designed to elicit values on expansion of winter range outside park boundaries. The other half of the respondents were asked questions on the value they would place on a vaccination and slaughter program to attempt to rid Yellowstone National Park area bison of brucellosis. The results of the analysis of both of these existence value issues are presented in volume 1, "Environmental Consequences: Impacts to Socioeconomics."

Representative Comment: 14832E, 14886I, 15316I, 15316Z

C Comment: The *Draft Environmental Impact Statement* did not adequately address the economic impacts of artificially limiting the bison population on the surrounding region. The impacts of decreased visitation to the park, related to decreases in bison population or tourism boycotts, have far-reaching economic impacts to other counties and states where visitors originate from and visit.

Response: The responses to issues 1 and 2 above outline the results of newly available survey-based information on the relationship between bison numbers in the Greater Yellowstone Area and the values visitors to the area place on bison within the ecosystem. The response to issue 2A specifically addresses what percentage of visitors to Yellowstone National Park said they would not have made their trip if bison had not been present in the park. Clearly, based on the 1999 visitor survey responses, if bison were not found in Yellowstone National Park, there would be an associated decrease in visitation to the park. Impacts of this lost visitation would be found in the counties surrounding Yellowstone National Park, but they would also be found in other portions of the three-state region through which nonresident visitors to the park must travel. Responses to the 1999 summer visitor survey indicate that nonresident visitors to the park spend about 40% of their total trip-related expenditures within the three-state area. Additionally, the majority of their spending in the three states, about 32% of their total expenditures, is done within the 17-county Greater Yellowstone Area. Any bison-related reduction in visitation to the park would impact the Greater Yellowstone Area, the three-state region, and areas outside the three-state region to different extents.

In volume 1, the "Affected Environment: Socioeconomics" section briefly addresses the issue of the possibility of a tourism boycott of Montana in response to continued lethal control of bison outside park boundaries. Peacock (1997) notes that the Fund for Animals took out a full page add in *USA Today* in early winter 1997 calling for a boycott of Montana as a tourist destination in response to the slaughter of bison under the interim plan. The response to this call for a boycott has not been measured. In general, the probability of a boycott actually occurring and the impact of such a boycott is difficult to judge. The state of Montana does not believe such a boycott is likely or that its economic impact would be substantial based on a similar boycott organized in response to hunting bison in 1988–89.

A tourism boycott organized in Alaska in the early 1990s in response to a state policy to reduce wolf populations was effective. In response to the boycott, Governor Hickle called off the wolf control program. It was estimated that had the boycott continued, the impact on the Alaska tourism economy would have been major and adverse, on the order of approximately $85 million in lost business or about 15% of the dollar revenues of this sector in Alaska (Dindinger, undated).

Any visitation reductions to the state of Montana due to a tourism boycott would lead to expenditure reductions outside of the 17-county Greater Yellowstone Area.

Representative Comment: 15329J, 15420LI, 15420O

D Comment: The entire nonmarket values discussion is very suspect and is based on an extremely controversial and largely discredited methodology that involves significant assumptions. Many economists view the evaluation of nonmarket outputs as black magic that produces nothing but confusion. The use of relative terms rather than cardinal dollars would best be used in this type of nonmarket evaluation.

Response: This comment correctly notes that there is some debate among economists over the use of nonmarket values.

It is important to note that there are a variety of nonmarket valuation techniques, including travel cost analysis, hedonic price analysis, factor income approach, and contingent valuation. All four of these approaches are designated in federal guidelines (the U.S. Department of Interior CERCLA regulations at 43 CFR 11) as a best available procedure for valuation of damages arising in Superfund natural resource damage cases. The debate focuses largely on contingent valuation, which is the nonmarket technique used for most of the values reported in the environmental impact statement. The use of contingent valuation for estimating values for direct recreational use (one of the types of applications in the impact statement) is not particularly controversial, and the values are generally similar to results from other methods, such as travel cost analysis.

The controversial applications are for the use of contingent valuation to estimate so-called passive use values or existence values where a value is associated with indirect use, such as knowing that winter range has been established for bison or that vaccination will reduce seroprevalence to zero. The debate over the application of contingent valuation to estimates of passive use values became politicized during challenges to the CERCLA regulations and in the course of the Exxon *Valdez* oil spill case. The two sides of the debate were the public trustees who stood to benefit from damage assessments and the potentially responsible parties (industry) who stood to lose. An outcome of these debates was a court challenge to the regulations by industry (*Ohio v. United States Department of Interior*, 880 F. 2d 432 (D.C. Circuit)) in which the court upheld the use of contingent valuation.

In the context of the development of related regulations by the National Oceanic and Atmospheric Administration, a distinguished panel of economists and other scientists, including several Nobel laureates in economics, was asked to evaluate the use of contingent valuation. The panel concluded that "contingent valuation studies can produce estimates reliable enough to be the starting point of a judicial process of damage assessments, including lost passive-use values." (K. Arrow et al. 1993. "Report of the NOAA Panel on Contingent Valuation," *Federal Register* (15 January), 58 (10):4601-14).

The panel describes a number of guidelines for contingent valuation studies to follow in order to be acceptable for judicial applications. The applications reported in this environmental impact statement meet most of these standards, including use of a referendum (dichotomous choice) format, no-answer or "don't know" option, checks on understanding and acceptance, intertemporal scope designs, reminders of available substitutes, and adequate description of the program or policy. The guidelines also suggest that surveys with an overall response rate of less than 50% should, other things being equal, be judged unreliable. This was the standard used in the final environmental impact statement in reporting that estimates based on the national phone-survey results may be unreliable (and were not used in the benefit-cost tables). The guidelines additionally suggest that the preferred mode of contact in the survey was in-person, though phone surveys also have some advantages. Mail surveys are the least preferred. Both mail and phone formats were used for the final environmental impact statement, as the available budget for the survey work was not sufficient to cover in-person surveys, which are very expensive.

The panel also offers the general guideline that conservative methods should be used where possible. Specifically, conservative choices made in the design of the contingent valuation applications for the final environmental impact statement included the use of a referendum format, use of a one-time rather than annual payment vehicle, use of a question format (polychotomous choice) that explicitly includes a substitute, in aggregation using a conservative interpretation of the willingness-to-pay results as applying

only to the travel-group or household (rather than individual), and use of a conservative literature-based calibration between stated willingness-to-pay and actual willingness-to-pay.

To conclude, there is adequate justification in federal regulatory guidelines to support the use of contingent valuation in policy analysis. The methods applied were conservative and consistent with the economics literature. To suggest that this is a "largely discredited methodology" is to accept a view that has been rejected by the courts and by a distinguished panel of economists and scientists.

Nonetheless, in recognition of the debate over these methods, the nonmarket estimates are now presented as a separate column in the final environmental impact statement benefit-cost tables. This is intended to make it convenient for decision makers and others to evaluate these estimates themselves. In addition to presenting the specific dollar values derived from nonmarket analysis, the final environmental impact statement also presents a great deal of information on social values. The reported measures of public attitudes (e.g., percentage agreeing and disagreeing) provide a more qualitative perspective on the relative values at issue.

Representative Comment: 15316, 14305

Reasonable Project Costs (SO-41)

Issue 1: ***Bison Management is Too Costly for the National Park Service***

A Comment: The National Park Service has a backlog of other commitments and does not have the funds for additional projects.

Response: The National Park Service mission, its *Management Policies*, and objectives require the management of natural resources, in this case bison (see Volume 1, "Appendix E: Legislation and Policy Guidance"). Funding and associated management objectives and priorities are developed by the U.S. Congress, U.S. Department of the Interior, and by the National Park Service at the national, regional, and park levels.

Representative Comment: 3698B

Issue 2: ***Other Alternatives Are More Cost-Effective.***

A Comment: Other alternatives suggested by the public, i.e., the "Citizens' Plan," "Plan B," the "Bison Alternative," etc., are more cost-effective than the environmental impact statement alternatives.

Response: A number of other permutations and combinations of these and related actions were developed by citizen's groups in comments on the *Draft Environmental Impact Statement*. The General Accounting Office was requested to evaluate the cost-effectiveness of these plans, but was unable to since costs and benefits specific to the plans was generally not provided. However, as noted in the U.S. General Accounting Office report (1999), a consultant to the sponsors of "Plan B" did assess the cost-effectiveness of "Plan B" and the "Citizens' Plan." The General Accounting Office report concluded (p. 19) that, "The consultants analysis is, however, of limited use because it is based on questionable assumptions."

It is not possible, given the lack of information, to undertake a complete benefit-cost evaluation of the other proposed alternatives, including "Plan B," the "Citizens' Plan," the "Bison Alternative," and the USAHA Plan. A generalization is that the first three plans incorporate more actions for active management of cattle than the alternatives developed for this environmental impact statement. With regard to direct benefits and costs, it is possible to evaluate these plans to a certain extent based on table 4.

TABLE 4: BENEFIT-COST OF BISON MANAGEMENT OBJECTIVES AND ACTIONS; SUMMARY OF RANGE OF ALTERNATIVES INCLUDING THOSE FROM PUBLIC COMMENTS (in dollars)

Objective / Action[1]	Direct Benefits and Costs			Present Value of Nonmarket Costs or Benefits	Net
	Annual Costs[2]	Present Value Costs	Present Value Benefits		
(A) Protect Livestock from Risk of Brucellosis[3]					
1. Monitoring of bison	44,000[4]	400,700	≤1,514,000[5]		
2. Agency shooting	--[6]				
3. Calfhood vaccination of cattle with RB51	--	[7]			
4. Surveillance testing of cattle	--				
5. Other cattle management actions[8]	--				
6. Modify national forest grazing allotments		88,000[9]			

Objective / Action[1]	Direct Benefits and Costs				
	Annual Costs[2]	Present Value Costs	Present Value Benefits	Present Value of Nonmarket Costs or Benefits	Net
(A) Protect Livestock from Risk of Brucellosis[3]					
7. Bison hunting	66,000[10]	481,000	185,700 – 389,200	58,400 – 175,100	
8a. Capture, test, and slaughter at boundaries	264,000 – 963,500	2,471,294 – 8,829,400[11]	128,500 – 475,400[12]		
9. Vaccination of bison	330,500 – 338,000	2,145,000 – 2,321,100			
10. Quarantine bison	447,500[13]	4,282,100 – 4,372,600[14]	825,800 – 1,796,300		
11. Winter road grooming	55,000 – 575,960[15]	401,500 – 1,511,500	[16]		
(B) Public Safety, Private Property Damage					
12. Remove bison at landowner request[17]	--				
(C) Commit to Eliminating Brucellosis in Wildlife					
8b. Herd-wide capture, test, and slaughter – alternative 5[18]	2,636,760	11,292,000	376,400	1,695,1505	
8c. Herdwide capture, test, and slaughter – alternative 6[19]	2,132,560 – 2,678,160	9,931,357	411,600		
(D) Viable Population of Wild Bison[20]					
13. Bison population range[21]	--	0[22]			
14. Bison management on public lands	--				
15. Acquire additional wildlife habitat		15,100,000[22]		4,177,700 – 4,177,727	
(E) Research					
16. Wildlife / winter use monitoring	5,500 – 27,500[23]	50,100 – 200,747			
Totals		5,705,241 –15,822,800	1,642,500 – 3,785,700	81,700 – 4,203,100	(8,768,700) – 81,959

1. List of actions based on table 9, DEIS, except for addition of "other cattle management actions." Contingency plans not listed as a separate action could modify the timing or extent of many actions listed here.

2. Costs are derived from alternative-specific cost tables to the extent possible. Costs are often not broken out at the action/objective level.

3. Includes objectives 1, 2, 5, and 6 in table 9, DEIS.

4. Based on alternative 2

5. Benefit to satisfaction of all four objectives is the expected present value of loss of class-free status for the entire state, if based on a risk of brucellosis infection is 2 in 31 years. For Gallatin and Park counties the corresponding estimate is $61,398. For the SMAs it is $13,622.

6. Based on alternative 2

7. No specific costs were broken out in the cost tables for this action in volume 1, "The Alternatives."

8. Other cattle management actions are listed under same objective/alternative as in table 9, DEIS, but are not line items in table 10, DEIS, or line items in alternative-specific cost tables, including test/vaccinate adult cattle and conversion to steer/spayed heifer operations.

9. Based on alternative 2.

10. Alternative 7.

11. Alternatives 7, the modified preferred alternative, etc. assume capture facility costs are sunk costs (total of $379,000, modified preferred alternative). Includes equipment repair and replacement.

12. Revenue from sale of hides, horns, and meat is based on an average value of $337 per animal.

13. Based on the modified preferred alternative.

14. Includes average of range of costs, $550,000 to $880,000 (alternative 7 and the modified preferred alternative) for quarantine facility.

15. Snowmobile enforcement, alternative 2.

16. Savings from not plowing roads in alternative 2.

17. Bison hunting could also contribute to this objective, but would not be sufficient to accomplish it.

18. Vaccination of bison might also contribute to this objective, but would not be sufficient to accomplish it.

19. Alternative 6.

20. Also includes elements of objective 1.

21. This is more of an outcome than an action.

22. $29.1 million to acquire level 1 (see alternative 7 and the modified preferred alternative) are sunk costs (lands already acquired). Cost for level 2 is based on alternative 2 less $29.1 million.

23. Alternative 2.

"Plan B" (Garrity 1998) provides for two cost elements: vaccination of bison at a cost of $2.4 million and a cost of $600,000, either as compensation to ranchers to switch to steer-only operations (or to livestock other than cattle) or to provide 200 miles of fence to keep bison separate from cattle. The steer-only operation conversion would likely be cost-effective. Some fencing could likewise be cost-effective. However, the plan rests heavily on the assumption that zero seroprevalence in bison could be achieved through vaccination alone. The 1998 NAS report suggests that this is not feasible. "Plan B" also does not explain how bison numbers and movements are to be limited. In other words, "Plan B" does not fulfill the "Purpose of and Need for Action" stated in the environmental impact statement, or many of the objectives. For more information on these points, please see "Alternatives: Plan B" in this volume.

The "Citizens' Plan" is most similar to the final environmental impact statement modified preferred alternative, except the "Citizens' Plan" does not include capture, test, and slaughter operations. This plan would place a greater emphasis on the management of cattle, including changes in national forest allotments and incentives to modify cattle operations. These actions would likely be cost-effective. This plan also provides for land acquisition or easements for winter range. However, the plan relies on population control by hunting, which is uncertain, and quarantine, which is expensive. The benefits and costs might be similar to alternative 3 or 4.

The "Bison Alternative" would rely on natural regulation to control bison numbers. The NAS study suggests this approach is not feasible. (Please see "Alternatives: Bison Alternative" in this volume for more information.)

The Fort Belknap Tribe proposal would favor allowing bison to roam freely and would minimize risk through changes in cattle operations and acquisition of lands. Population control would be through hunting by tribal members, quarantine and capture, test, and slaughter facilities. The costs and details of operation concerning the latter are not well-defined. The quarantine and capture, test, and slaughter elements of this plan would probably dominate the benefit-cost results.

The USAHA Plan is most similar to alternative 6. This plan suggests a period of vaccination for bison to reduce seroprevalence, followed by herd-wide test and slaughter. Benefits and costs would be dominated by these actions and would likely be similar to alternative 6. The plan would limit bison movements outside the park to the Eagle Creek-Bear Creek area.

For more information on these alternatives with respect to the management plan's objectives, see volume 1, "The Alternatives."

Representative Comment: Form 19C, 14893B, 1718S, 2796B

Issue 3: ***Agencies Should Divert Funds toward Specific Management Actions***

A Comment: Public funds should be spent on risk reduction.

Response: All alternatives focus on risk reduction, primarily through spatial and temporal separation. In some alternatives, separation includes hazing, capture, test, and slaughter or quarantine; agency monitoring and shooting; changes in cattle operations; or land acquisition in the impact area. Bison vaccination is also included in all alternatives to reduce seroprevalence and therefore risk. These risk reduction tools are what agencies have costed in each alternative.

Representative Comment: Form 25F

Issue 4: ***Specific Management Activities Were Identified as Cost-Effective or Costly***

A Comment: Construction and operation of a quarantine facility for bison is costly and wasteful.

Response: It is true that quarantine is not particularly cost-effective. However, quarantine is the only means available to the agencies to produce live, disease-free bison, which would then be used as breeding stock to begin or contribute to other bison herds. The value of such an option may go far beyond the actual monetary cost. In terms of the benefits and costs of quarantine, see this volume, "Socioeconomics: Benefit and Cost Impacts."

Representative Comment: 5123B

B Comment: Sterilization (neutering) of bison is less costly.

Response: The agencies identified this alternative in the public scoping process, considered its impacts and reasonableness, and eliminated it from further analysis (see volume 1, "Purpose of and Need for Action: Introduction — Need for Action" and "—Purpose of Action," and volume 1, "Purpose of and Need for Action: Scoping Process and Public Participation — Objectives, Alternatives, and Issues from Public Comments (Alternatives Suggested but Not Analyzed)."

Representative Comment: 7434B

C Comment: Feeding bison is less costly.

Response: The agencies identified this alternative in the public scoping process, considered its impacts and reasonableness, and eliminated it from further analysis (see volume 1, "Purpose of and Need for

Action: Scoping Process and Public Participation, Objectives, Alternatives, and Issues from Public Comments (Alternatives Suggested but Not Analyzed)."

Representative Comment: 13027E

D Comment: Some individuals believed testing bison is a waste of money because the test is inaccurate and bison have not spread the disease to cattle.

Response: While not 100% accurate, the agencies have committed to bison testing as a tool for managing the risk of disease transmission, while allowing bison to occupy areas outside the park in certain zones and under certain conditions.

Representative Comment: 13266D

E Comment: Many comments focused on the management of cattle, modifying cattle grazing and increased grazing fees, or outright purchase of cattle as cost-effective, compared to alternatives in the environmental impact statement.

Response: Alternative 2, as analyzed in volume 1, "Environmental Consequences," has the greatest emphasis on purchasing cattle lands, modifying cattle allotments, and providing for easements and winter range. The benefit and cost analysis has been revised in the "Environmental Consequences: Socioeconomics" section to compare alternative 2 with the other alternatives.

Representative Comment: 9586G, 10026B, 823C, 11031F, 3339D

Issue 5: ***Questions Regarding Data Used***

A Comment: The value of hunting license revenue to the Montana Department of Fish, Wildlife and Parks was not included for those alternatives having hunting.

Response: Estimated receipts to the Montana Department of Fish, Wildlife and Parks from license fees are included for alternatives 3, 4, and 7.

Representative Comment: 1999B

Issue 6: ***Cost Not an Issue When Preserving Bison***

A Comment: Money should not be an issue when preserving a species (bison).

Response: The environmental impact statement was revised to provide an updated assessment of what "value" bison have to various sectors of the population; see volume 1, "Affected Environment: Socioeconomics." Please also see this volume, "Socioeconomics: Social Values" for similar comments and responses.

Representative Comment: 16882B

Social Values (SO-42)

Issue 1: ***Impacts on Those Viewing the Yellowstone Herd as a Symbol or Icon***

A Comment: Some alternatives decrease the number of bison throughout time and restrict bison movement outside the park. Those who value the presence of a wild and free-ranging bison herd are concerned that management actions will diminish bison numbers and therefore impact the species connection as part of American heritage.

Response: The final environmental impact statement provides an expanded discussion of social values associated with bison that is based on surveys conducted in 1999 of park visitors and regional and national populations.

There are strongly differing opinions on the issue of whether bison in the Greater Yellowstone Area should be allowed to range onto public lands outside the park. A 1999 random phone survey of people living in the Greater Yellowstone Area, the three-state (Montana, Wyoming, and Idaho) region, and nationally found that many people feel bison should be allowed to range freely on public lands. An equal number in all three geographic populations, however, disagreed with the statement, "Yellowstone bison should be allowed to range onto public lands outside Yellowstone National Park." Nationally, 42.6% of respondents agreed with this statement and 41.7% disagreed. Regionally and locally, opinion was also split on this issue, with slightly more people in both populations disagreeing with the statement.

On the issue of concern over diminishing bison numbers, respondents to the 1999 national phone survey were asked whether they agreed or disagreed with the following statement, "It is appropriate to kill bison at park boundaries as necessary to protect domestic livestock." For all three sample populations, more respondents agreed with this statement than disagreed (in the 17-county Greater Yellowstone Area 55.7% agreed and 33.6% disagreed; in the three-state region 56% agreed and 31.9% disagreed; and in the national sample 51.5% agreed and 33.2% disagreed.)

Responses to the 1999 random phone survey show that opinion is divided on these key issues of bison management, and both opinions are well-represented in the populations sampled.

Representative Comment: Form 52E

B Comment: Commenters who have visited or expect to visit Yellowstone National Park were concerned that the wildlife, namely bison, they value and expect to see in its natural habitat will be diminished or not as available for viewing, photography, etc. Visitors value the presence of Yellowstone National Park bison as a wild and free-ranging species and do not want management actions to impact this value.

Response: Wildlife viewing is the single most common activity engaged in by summer visitors to Yellowstone National Park. In a 1999 survey of summer visitors, 95% of visitors listed wildlife viewing and 72% listed wildlife photography as an activity engaged in on their trip. The issue of whether the bison population reductions described in the environmental impact statement would lead to measurable reductions in how visitors to the park value their visits, however, is not so clear. Responses to a 1999 summer survey of park visitors did not show any systematic relationship between the number of bison seen by visitors on their trips and the value they ascribed to their trip. The lack of such a statistical relationship is likely due to the fact that nearly all (97%) summer visitors responding to the survey had seen bison on their trips. In addition, most visitors had seen a relatively large number of bison.

While marginal changes in the number of bison in the park may not be associated with changes in visitor trip values, a significant number of respondents to the summer and winter visitor surveys indicated that seeing bison was one of their reasons for visiting the Greater Yellowstone Area. Among park visitors in both the summer and winter surveys, about 50% said that seeing bison was a reason for their trip (48.9% of resident summer visitors, 52% of nonresident summer visitors, and 53.9% of winter visitors). In addition, a portion of these respondents said that they would not have made their trip to the park if bison

had not been present. Overall, 5% of resident summer visitors and 3.6% of nonresident summer visitors said they would not have come to the park in the absence of bison. In the winter survey 6.6% of park visitors said they would not have made the trip if bison had not been present in the park.

Representative Comment: 4C

C Comment: Some commenters said that they value the ability of Yellowstone National Park bison to use public land outside of the park more than they value the ability for livestock operators to use these lands for cattle grazing. Hence, their preference is to focus management actions on the removal of cattle rather than the removal of bison.

Response: Responses to both Yellowstone National Park visitor surveys and a national random phone survey indicate that a significant number of people value the ability of bison to range onto, and use, public lands outside the park. These results are reflected in the substantial number of survey respondents who agreed with the statement, "Yellowstone bison should be allowed to range onto public lands outside of the park." Among phone survey respondents, about 43% of all three sample populations (local Greater Yellowstone Area, three-state region, and U.S.) agreed with this statement. In addition, a substantial number of respondents to the survey said they would be willing to donate money to a trust fund designed to acquire additional bison winter range outside of the park. From the survey of summer visitors to the park, a similar pattern was found. Among three-state residents, 48% agreed bison should be allowed to range outside the park. Among nonresidents this percentage was 40%.

While there is significant support for allowing bison to range onto public lands outside the park, there is also diversity of opinion on this issue. Among phone survey respondents, 45% of the local, 45% of the regional, and 42% of the national population disagreed with the statement that bison should be allowed to range outside the park. Among summer visitors to the park, 35% of residents and 33% of nonresident visitors disagreed with the idea of free-ranging bison populations.

The respondents to the phone and visitor surveys were also asked whether they agreed or disagreed with the following statement, "Livestock grazing is an appropriate use on national forest lands around Yellowstone National Park." Among phone survey respondents, 67% of the local, 61% of the regional, and 49% of the national sample agreed with this statement (33%, 27%, and 34%, respectively, disagreed). Respondents to the summer visitor survey were less likely to agree with the statement, with 49% of residents and 41% of nonresidents agreeing (31% of residents and 36% of nonresidents disagreed).

The generally wide diversity of opinion on the issue of bison ranging and cattle grazing on public lands outside the park is now reported in the revised social values section in volume 1, "Affected Environment: Socioeconomics."

Representative Comment: 172I

D Comment: Some commenters perceive Montana's treatment of Yellowstone National Park bison to be such that they would choose not to visit the state until this treatment was modified or stopped.

Response: The "Affected Environment: Socioeconomics" section of volume 1 briefly addresses the issue of the possibility of a tourism boycott of Montana in response to continued lethal control of bison outside the park boundaries. Peacock (1997) notes that the Fund for Animals took out a full page add in *USA Today* in early winter 1997 calling for a boycott of Montana tourism in response to the slaughter of bison under the *Interim Bison Management Plan*. The response to this call for a boycott has not been measured. In general, the probability of a boycott actually occurring and the impact of such a boycott is difficult to judge. The state of Montana does not believe such a boycott is likely or that its economic impact would be substantial, based on a similar boycott organized in response to hunting bison in 1988–89.

A tourism boycott organized in Alaska in the early 1990s in response to a state policy to reduce wolf populations was effective. In response to the boycott, Governor Hickle called off the wolf control

program. It was estimated that had the boycott continued, the impact on the Alaska tourism economy would have been major and adverse, on the order of approximately $85 million in lost business or about 15% of the dollar revenues of this sector in Alaska (Dindinger, undated).

Representative Comment: 230P

E Comment: Commenters expressed dismay that natural regulation of bison means that some animals would likely starve in the park. These commenters value the overall well-being of bison and favor taking action to save bison lives at all costs.

Response: From an ecological standpoint, the overall well-being of the bison herd may require natural selection pressures — survival of the fittest — to be operating. In any case, the park policy on natural regulation is explained in volume 1, "Affected Environment: Bison Population."

With respect to social issues, the national phone and Yellowstone National Park visitor surveys conducted in 1999 did not directly ask any questions regarding respondent attitudes toward natural regulation of bison numbers. In volume 1, "Affected Environment: Bison Population" natural mortality and its primary causes among Yellowstone National Park bison are discussed in general terms. While there may be a significant number of individuals who are concerned about bison dying of winterkill, a related survey question on bison mortality showed that a majority of respondents in a random national phone survey agreed that it was appropriate to kill bison at park boundaries in order to protect domestic livestock. Clearly, many differing views are represented in the U.S. population on the issue of bison, bison population control, and bison mortality.

Representative Comment: 521C

F Comment: Commenters value Yellowstone National Park as having "immeasurable value" nationally and internationally and do not want park bison or the landscape of the park diminished by placement of capture facilities inside its boundaries.

Response: Responses to a 1999 random national phone survey underscored the fact that Yellowstone National Park is a special place with great value. Nationally, 33.7% of respondents said that they had visited the park at some time in their lives. For the three-state region, the visitation percentage was 88.5%, and for the local Greater Yellowstone Area, 98.3%.

While Yellowstone National Park has drawn, and continues to draw, large numbers of visitors from around the world, responses to a 1999 summer survey of park visitors found that on the issue of capture, vaccination, and slaughter of bison, opinion is divided. Among 1999 summer visitor respondents, 21.5% of residents and 35.4% of nonresidents agreed with the statement that "All bison in Yellowstone National Park should be rounded up and tested for disease then either slaughtered or vaccinated." Among residents, 52.7% disagreed, and among nonresidents, 28.4% disagreed. The summer visitor survey results showed that both attitudes (procapture and anticapture) are well represented in the visitor population.

Representative Comment: 1302E

G Comment: Commenters value Yellowstone bison as a wild and free-ranging species and do not want them treated as domestic livestock, ranched, or otherwise over-handled, taking their "wildness" and behavior as "wildlife" away.

Response: The interagency team has defined a wild, free-ranging population of bison as one that is not routinely handled and can move without restrictions within specific geographic areas. No alternatives are expected to affect the wildness of the herd on a long-term basis, although the herd would be routinely handled for a short period of time in alternatives 5 and 6. Responses to issues 1A, 1C, and 1F detail how a series of 1999 surveys found that the attitudes described in issue 1G are well-represented, both in the visitor population and in the national population. These responses, and the survey data, also indicate a

significant portion of respondents support the handling necessary to test and vaccinate Yellowstone National Park bison. As on many complex issues, opinion on this issue is divided, with both favoring and opposing views being well-represented.

Representative Comment: 2535F

H Comment: Commenters value the National Park Service as the public servant to protect national parks and value the National Park Service's role in fulfilling its mandate to protect the scenery and wildlife for the enjoyment of future generations. As such, they do not want the National Park Service to compromise the well-being of Yellowstone National Park bison and the landscape of Yellowstone.

Response: Visiting Yellowstone National Park is a highly valued experience for many park visitors. A 1999 survey of summer visitors found that the median estimated net economic value (the value to the visitor over and above what they actually spent on the trip) associated with each visit was $56 for three-state residents and $349 for nonresidents. In addition to the value associated with visiting the park, respondents to a 1999 national phone survey were asked several questions on their attitudes toward the protection of wildlife habitat, and concern for disturbance of bison in the park. Among national population respondents, 93.7% agreed with the statement, "I have a great deal of concern for protecting wildlife habitat." In addition, 77.4% agreed with the statement, "I am concerned about the possible disturbance of Yellowstone National Park wildlife in the winter." However, among this same population, 51.5% agreed, "It is appropriate to kill bison at park boundaries, as necessary, to protect domestic livestock." These survey results indicate that substantial concern over the well-being of Yellowstone National Park wildlife in general, and bison in particular, is tempered when discussed in the context of complicating issues, such as disease transmission from bison to livestock.

No specific questions in the 1999 survey were asked regarding the custodial role of the National Park Service and its personnel in protecting the park and its wildlife.

A specific objective of the alternatives described in the environmental impact statement is to maintain a wild and free-ranging bison herd in Yellowstone National Park that meets ecological and genetic criteria for sustainability.

Representative Comment: 6188D

I Comment: The *Draft Environmental Impact Statement* states that there would be economic impacts should snowmobile trails be closed to keep bison from going outside the park; adverse economic impacts to tourism if bison viewing opportunities were reduced; potential impacts from tourism boycotts; and increased revenue potential if bison viewing opportunities were increased. Yet the likelihood of transmission of brucellosis from bison to cattle is very unlikely to occur.

Response: Impacts related to snowmobile trail closures, bison viewing, and tourism boycotts are all potentially significant impacts, as noted in this comment. Updated information related to these issues is included in the final environmental impact statement and is described in part in this volume in "Socioeconomics: Nonmarket Values," issues 3B, 3C, and 4D. The likelihood of brucellosis transmission from bison to cattle is judged by the NAS (1998) to be small, but not zero. Discussion is included in the final environmental impact statement suggesting that an approximate estimate of the annual probability of such a transmission for the area north and west of Yellowstone National Park in a "without plan" case might be in the range of a 0.010 to 0.065. To compare this to the listed or other impacts, one needs to also estimate the costs associated with the consequences of an infection transmission (see also this volume, "Socioeconomics: Cost to Livestock Operators"). Such an analysis is now included in the final environmental impact statement.

Representative Comment: 10540H

J Comment: Some commenters questioned the *Draft Environmental Impact Statement* treatment of potential tourism boycott as an indication of Montana resident's support or opposition of the state's bison management policies. The commenters note that it is not just outsiders and nonresidents that have concerns with this issue. They asked that the final environmental impact statement address the relative social value of bison and the support and opposition to Montana's management policies.

Response: The 1999 Yellowstone National Park visitor and national phone surveys asked respondents a number of questions on attitudes regarding the treatment of bison and bison management in the Greater Yellowstone Area. Responses to these surveys were coded to distinguish those resident respondents living in the three-state region and those from outside the region. Two types of surveys were conducted: visitor surveys of both winter and summer visitors to the park, and a national random phone survey.

Among respondents to the winter 1999 Yellowstone National Park visitor survey, there was a statistically significant difference between residents and nonresidents on the key issues of killing, testing, and vaccinating bison. Among these winter park users, residents were more likely to disagree with the statement, "It is appropriate to kill bison at park boundaries as necessary to protect domestic livestock" than were nonresidents. Similarly, resident winter visitors were more likely than nonresidents to disagree with the statement, "All bison in Yellowstone National Park should be rounded up and tested for disease then either slaughtered or vaccinated." Among respondents to a 1999 survey of summer visitors to the park, the same results were found. Resident summer visitors were significantly more likely than nonresident visitors to disagree with two statements above.

While significant differences were found in attitudes on bison management among both winter and summer visitors to Yellowstone National Park, the responses of the phone survey regional (three-state) and national (U.S.) populations showed much more similarity. Responses to the two statements, "It is appropriate to kill bison at park boundaries as necessary to protect domestic livestock," and "Yellowstone National Park bison should be allowed to range onto public lands outside Yellowstone National Park" were almost identically split between agreeing and disagreeing across the local (Greater Yellowstone Area), regional (three-state), and national (U.S.) samples. One significant difference was found in the phone samples, with regional residents being more likely then the U.S. sample respondents to agree with the statement, "Livestock grazing is an appropriate use on national forest lands around Yellowstone National Park." A complete discussion of these survey results is now included volume 1, "Affected Environment: Socioeconomics."

Representative Comment: 15420O

K Comment: The 1998 NAS report asserts that the Yellowstone bison herd is the most genetically diverse herd in existence in this country and as such is highly valued as a public resource. Being genetically unique, the value of these bison in repopulating other public lands is significant.

Response: Respondents to a 1999 national random phone survey indicated strong support for protecting the species to maintain genetic diversity. Among the national population, 91% of respondents agreed with the statement, "It is important to protect rare plants and animals to maintain genetic diversity." Among respondents from the three-state region, 84% agreed with this statement.

Representative Comment: 15420VV

L Comment: Language authorizing the Montana Department of Livestock to capture, test, quarantine, vaccinate, and sell live wild bison was added to Montana House Bill 547 in 1997. The *Draft Environmental Impact Statement* is in error, according to these commenters, that the general public wants Yellowstone bison to be made available to all who want them. Regardless of House Bill 547, Yellowstone National Park bison are a valued public resource and must not be treated as a commercial commodity.

Response: The response to issue 1G in this section addresses the question of public opinion on how bison should be treated (wild and free-roaming vs. captured and tested like domestic livestock). As noted in the response to issue 1G, opinions on these issues are divided, with differed point of view being well-represented.

Representative Comment: 15420VV

use

Overall Visitor Use and Experience (VU-44)

Issue 1: ***Impact of Quarantine and Capture Facilities on Visitor Experience***

A Comment: What impact will quarantine facilities have on visitors?

Response: Although the location and design of the quarantine facility has not been determined, the facility would probably appear as large-scale corrals and pens, within which bison would be visible. It is unlikely that a quarantine facility would be located inside park boundaries. The siting of the facility outside of the park would be sensitive to views and features of the viewshed; therefore, impacts on the visitor experience are expected to be minor.

Representative Comment: 2D

B Comment: Capture facilities and quarantine facilities will have a negative impact on the visitor experience, as they will detract from the wildness of Yellowstone National Park.

Response: Quarantine facilities are proposed as a management action in alternatives 3, 4, 7, and the modified preferred alternative. The locations of quarantine facilities have not been determined; however, it is unlikely that they would be within park boundaries. Any construction would be done according to National Environmental Policy Act regulations and a number of possible sites would be considered. Review of the quarantine facility would include an analysis of impact to visitor experience. The facilities would probably appear as large-scale corrals and pens, within which bison would be visible. The siting of the facility would be sensitive to views and features of the viewshed. As stated in the *Draft Environmental Impact Statement* in the "Environmental Consequences: Impacts on Visual Resources," section, "the National Park Service has not developed a visual resource management system for public lands under its jurisdiction; however, the overriding management purpose in a park is preservation of all significant resources, including scenery." Capture facilities proposed in alternatives 5 and 6 for inside the park would have similar impacts to those analyzed for the Seven-Mile Bridge area. The final environmental impact statement provides updated information on these impacts in the "Environmental Consequences."

The present capture facility at Stephens Creek is not readily visible to the majority of park visitors. The facilities on the western boundary would not be visible in major viewsheds, but some visitors to the park or the national forest and residents of the area would see them. Dismantling the capture facilities at Stephens Creek and West Yellowstone, as proposed in alternatives 2, 3, and 7, would restore the visual scene to more natural conditions and would represent no impact on the overall visitor experience.

Representative Comment: 1366H, 361C

Issue 2: ***Impacts of Bison Management Activities on Visitor Use***

A Comment: Management activities such as capture/test/slaughter operations, hazing, shooting and gutting of bison will have a negative impact on the visitor experience.

Response: The *Draft Environmental Impact Statement* states that agency shootings of bison and some hazing operations would be visible if bison ventured beyond delineated SMAs. These actions would have a minor to major visual impact on the landscape for some viewers who might be opposed to shooting or hazing bison or to those viewers sensitive to these activities (see volume 1, "Environmental Consequences: Impacts on Visual Resources"). Alternatives 1, 4, 7, and the modified preferred alternative may have a minor negative impact on overall visitor experience due to the presence of capture facilities and quarantine facilities. Bison management activities, such as hazing and shooting, associated with these alternatives could have a major negative visual impact. The modified preferred alternative would have impacts similar to those discussed under alternative 1 during steps 1 and 2 of the plan. However, during step 3, impacts on the visitor experience would be much less due to the potential for less capturing and handling of bison. Phase 2 of alternative 2 would not include capture facilities or management actions

relative to slaughter, and there would likely be no adverse impacts on the overall visitor experience during phase 2. Alternative 3 would provide capture facilities only as a backup to hunting: as a result, there would likely be negligible impacts on the overall visitor experience from capture. Alternatives 5 and 6 would have the greatest adverse impact on visitor experience. These alternatives would result in a major decrease in the total bison population by shooting and slaughtering, and nine capture facilities would be constructed throughout the park. Therefore, management actions would be highly visible to park visitors depending on the visibility and timing of management actions.

Representative Comment: 3544C

Issue 3: ***Importance of Bison Viewing to the Visitor Experience***

A Comment: Viewing bison is an educational experience.

Response: Wildlife viewing is the primary activity for many visitors to Yellowstone National Park. In a survey of park visitors during May–July 1999, it was found that 95% of respondents stated wildlife viewing was the most important activity (see volume 1, "Affected Environment: Recreation"). Viewing wildlife can be very educational for visitors in that it provides a first-hand look at how animals persist in their natural environment. Watching animals can provide valuable information about animal behavior such as feeding, mating, and interacting with other animals of the same species or other species. Viewing wildlife also gives an indication of the habitat that animals prefer. Bison are most often seen grazing in open meadows along rivers. Along with personal observation, Yellowstone National Park personnel make an effort to provide informational material for visitors through park signs, visitor centers, park rangers, pamphlets, newspapers, and research. In a survey conducted in 1992, nearly 48% of the respondents found visitor centers to be the most helpful sources of information about wildlife (Compton 1992).

Representative Comment: 155A

B Comment: Alternative 7 will result in fewer bison viewing opportunities.

Response: The bison population reductions proposed in alternative 7 could lead to long-term decreases in annual bison viewing-related visitation. Bison populations would be expected to be 12%–15% lower (based on the deterministic model) than alternative 1 over the next 7 to 12 years, with a maximum number of 2,700 bison. These population levels would likely result in a minor to moderate negative impact on general wildlife viewing in the park relative to alternative 1 (see volume 1, "Environmental Consequences: Impacts on Recreation"), with an estimated population level of 3,100 bison in 2006.

Representative Comment: 752C

C Comment: Commenters were disappointed about the lack of bison on recent visits to Yellowstone National Park, which they attribute to lower population numbers.

Response: The *Draft Environmental Impact Statement* states that despite natural mortality and management removals from 1984 to 1996, bison numbers increased an average of 5.1% per year, peaking at approximately 4,000 bison in 1994 and declining to approximately 3,500 bison in the early 1996–97 winter. During the winter of 1996–97, approximately 1,100 bison were subject to management removal, decreasing the population to 2,105 bison in 1997–98. Since then the population has begun to increase, and in the 1999–2000 winter, 2,444 bison were found occupying traditional Yellowstone winter ranges (see volume 1, "Affected Environment: Bison Population"). The 30% decrease in bison numbers from the winter of 1996–97 to the present has likely had an impact on the opportunity for visitors to view bison.

Representative Comment: 1667A

D Comment: An increase in the bison population will benefit park visitors, as in alternative 2.

Response: Alternatives 1, 2 and 3 would result in an increase in bison population size compared to current levels, which would have a minor to moderate positive impact on wildlife viewing opportunities compared to current conditions. The implementation of alternative 2 or 3 could result in an increase in the bison population to 3,500 bison, based on the deterministic model. Based on the enhanced stochastic model, alternative 2 would result in the highest projected population (5,247 animals) by 2014 compared to other alternatives (see volume 1, "Environmental Consequences: Impacts on Bison Population"). Alternative 2 would provide the maximum potential for bison to freely range beyond park boundaries onto public land and private lands where tolerated. Bison could be relatively common outside the park at certain times of the year under this alternative. While wildlife viewing is the most common activity engaged in by summer visitors to Yellowstone National Park, the issue of whether changes in bison populations would lead to measurable changes in how park visitors valued their visits is unclear. Summer survey results of park visitors did not show any systematic relationship between the number of bison seen by visitors and the value they ascribe to their trip. In addition, among park visitors in both a summer and winter survey, approximately 50% said that seeing bison was a reason for their trip and a portion of these indicated they would not have made their trip if bison had not been present (see volume 1, "Affected Environment: Recreation").

Representative Comment: 8987F

E Comment: Free-roaming wildlife, particularly bison, have aesthetic values that are an accessible experience for park visitors.

Response: Many visitors come to the park to view the wildlife and enjoy bison. Results of a 1999 survey of park visitors indicated that wildlife viewing was the single-most important activity for 95% of the respondents (see volume 1, "Affected Environment: Recreation"). During the public comment period for the *Draft Environmental Impact Statement*, over 15,000 comments were received pertaining to the social value of bison, and over half of these referred to bison using terms such as "national symbol" or part of our "western heritage." All commenters identified bison as having value to the park or to the individual respondent. All commenters indicated that the value of the bison was enough to preserve or maintain them for their own sake (Greystone Environmental Consultants 1999). In addition, 903 comments were received pertaining to visitor use or experience. The majority of these comments held the position that seeing buffalo is a major reason for traveling to Yellowstone National Park. Over 80% of the comments contained phrases such as "great to see bison roaming free" or "unqualified inspiration" (Greystone Environmental Consultants 1999). The final environmental impact statement analyzes the effects of all alternatives on visitor opportunities to view and experience wild bison.

Representative Comment: 15097M, 7429A

F Comment: People enjoy the opportunity to view bison in areas surrounding the park, such as Horse Butte.

Response: It is known from park visitor-use surveys that wildlife viewing is a primary activity of park visitors. No information exists concerning visitor use in areas surrounding the park in Montana. Bison are known to use Horse Butte in winter but are not known to access that area in summer. The current interim plan (alternative 1) allows for seronegative nonpregnant females and seronegative males to access the Horse Butte area from November 1 through April 30. Bison are also able to occupy the Cabin Creek Recreation and Wildlife Management Area and Monument Mountain unit of the Lee Metcalf Wilderness west of the park and north of the Horse Butte area without agency management, as these are public lands without grazing allotments. Alternatives 2 and 3 would result in a 14% increase in the bison population compared to alternative 1, based on the deterministic model. The modified preferred alternative would allow up to 100 untested bison to occupy lands north of the park during winter and early spring. This would result in a major benefit to viewers compared to alternative 1, which does not allow any bison to cross the northern park boundary.

Representative Comment: 15420CC

G Comment: There is an emotional impact on visitors seeing starving bison in winter.

Response: Although it is a difficult thing to witness, winter mortality is a natural process that occurs in Yellowstone National Park. It is probable that some visitors will react negatively to this process. However, visitors who understand bison ecology and natural processes will likely be impacted less when they encounter a starving animal. Bison carcasses are a valuable food source for predators in the park. An increase in bison mortality may result in an increase in the opportunity to view other wildlife such as wolves and bears, which are among the 10 animals visitors would most like to see in Yellowstone. The "Affected Environment: Bison Population" in volume 1 discusses natural mortality and its primary causes among bison. See also "Socioeconomics: Social Values" in this volume.

Representative Comment: 740B

H Comment: Park buffalo should not be subjected to roundup, tagging, inoculation, or anything that might alter their natural appearance. This is in the interest of the park and the large tourist industry. Visitors depend on successful buffalo sightings as part of their Yellowstone National Park experience.

Response: Each alternative uses tagging and marking of bison as a part of the testing or vaccinating procedure. Under the modified preferred alternative, however, marking and tagging of bison is expected to occur less frequently. During step 3 of the modified preferred alternative, there is the potential for less capture and handling of bison, and untested bison would be able to occupy lands beyond park boundaries to the west and the north, reducing the need to mark bison. Marking and tagging are necessary to identify bison that have tested negative for the *Brucella* organism or have been vaccinated. Although the marking, using paint/peroxide stripes and paperback tags, is visibly obtrusive, it is necessary in order to prevent bison from being handled or vaccinated more than once in a season. The small metal ear tags are very difficult to see and are not visually obtrusive. They would be used to identify and monitor the bison that are tested in subsequent years.

The commenter is correct in that many visitors come to Yellowstone National Park to view wildlife, and bison are ranked among the top 10 animals that people come to see (see volume 1, "Affected Environment: Recreation"). However, because the visible marks (such as paint/peroxide stripes and back tags), are temporary, the adverse impacts on visitor experiences would be short-term. The tags and markings, except for the small metal ear tags, disappear by the time they shed their winter coats in early spring, and therefore, winter users of the park would be most affected by the marking. It should be noted that only 4%–5% of total annual recreational visitation to Yellowstone National Park occurs from December through March (*Draft Winter Use Plan Environmental Impact Statement*). Therefore, the expected impact of marked or tagged bison on the tourist industry in and outside of Yellowstone National Park is expected to be minimal. See related response on marking and tagging methods in this volume, "Visual Resources: Landscapes and Viewsheds — Issue 1."

Representative Comment: 3539D

Issue 4: *Importance of Bison Viewing to Tourist Economy*

A Comment: The current management plan will result in a lower number of visitors.

Response: As stated in the *Draft Environmental Impact Statement*, continued use of alternative 1 would likely have offsetting positive and negative impacts on recreation (DEIS, p. 227). Continued use of alternative 1 would have a positive impact on bison viewing, because this alternative would not likely affect the overall distribution of bison in the park. Alternative 1 is expected to result in a 42% increase in the bison population, based on results from the deterministic model. Maintaining the use of alternative 1 would have a minor to moderate impact on overall visitor experience, due to the presence of management actions and capture facilities. Management activities associated with alternative 1 could limit visitor use of certain areas and visitors might react to seeing management activities either positively or negatively. The socioeconomic impacts associated with alternative 1 are expected to have a negligible impact on the

regional economy compared to the status quo in 1996–97. Continued use of alternative 1 would likely result in the continuation of existing socioeconomic trends (see volume 1, "Affected Environment: Socioeconomics").

Representative Comment: 2405F

Issue 5: ***Wildlife Viewing as Essential to the Yellowstone Visitor Experience***

A Comment: Commenters believe wildlife viewing to be the most important aspect of the park experience.

Response: Wildlife viewing is the single most common activity engaged in by summer visitors to Yellowstone National Park. In a 1999 survey of summer visitors 95% of visitors listed wildlife viewing and 72% listed wildlife photography as activities they engaged in on their trips. The issue of whether the bison population reductions described in the final environmental impact statement would lead to measurable reductions in how visitors to the park value their visits is not clear. Responses to the 1999 summer survey did not show any systematic relationship between the number of bison seen by visitors on their trips and the value they ascribed to their trip. The lack of such a statistical relationship is likely because nearly all (97%) summer visitors responding to the survey had seen bison on their trips. In addition, most visitors had seen a relatively large number of bison. This new survey-based data on the relationship between abundance of bison and visitor trip value is included in volume 1, "Affected Environment: Recreation." See also "Socioeconomics: Social Values" in this volume.

Representative Comment: 480A

B Comment: Considering the time and money spent viewing wildlife, how could wildlife viewing opportunities be expanded?

Response: Expanding wildlife viewing opportunities in the park is considered outside the scope of this plan and environmental impact statement. However, updated information on the socioeconomic impact related to bison viewing has been added to volume 1; see "Environmental Consequences: Impact on Socioeconomics."

Representative Comment: 3653D

Issue 6: ***Importance of Yellowstone Park Ecology to the Visitor Experience***

A Comment: The natural ecosystem and wildlife need to be preserved for the park to remain a natural wonder.

Response: We agree that it is important for Yellowstone National Park to preserve the natural ecosystem and wildlife. Part of the purpose of the national parks is to conserve the scenery, natural and historic objects, and wildlife, as stated in the Organic Act (16 USC 1). The overall NPS policy on wildlife seeks the perpetuation of native animal populations as part of the natural ecosystems of parks, with emphasis on minimizing human impacts on natural animal population dynamics (NPS 1988). Part of the NPS policy is to manage the natural resources of the national park system to maintain, rehabilitate, and perpetuate their inherent integrity.

Representative Comment: 4946K

B Comment: Yellowstone National Park and the bison allow visitors to experience a "healthy" ecosystem.

Response: As stated in the *Draft Environmental Impact Statement*, bison play an important role in Yellowstone's ecosystem. As part of the ecosystem, they consume plant material and contribute to new generations of plants by distributing seeds, breaking up soil surfaces with their hooves, and fertilizing by

recycling nutrients through their waste products. Although they are not a significant prey source for predators, their carcasses provide food for many animals (see volume 1, "Affected Environment: Bison Population" and "Bison: Ecology" in this volume.)

Representative Comment: 10633C

Issue 7: ***Impact of Bison Population on Vegetation in Yellowstone National Park***

A Comment: The current bison population size and bison management actions are degrading vegetation resources and related aesthetics within the park.

Response: See "Bison: Vegetation/Vegetative Communities" in this volume.

Representative Comment: 2919D

Issue 8: ***Human and Wildlife Interactions***

A Comment: An increase in the number of bison will result in more conflicts with humans.

Response: The environment shared by park visitors and employees and wild bison creates many opportunities for interaction and occasional conflict. On the average over the past 10–15 years, 7 to 8 people per year are injured by bison in Yellowstone National Park. None of the injuries seem to be correlated to shifts in bison movements. The number of incidents has been very low in proportion to the number of visitors, nearly 3 million people annually (NPS 1994).

Representative Comment: 9209D

Issue 9: ***Importance of Snowmobiling in Viewing Wildlife***

A Comment: People must have access to the Yellowstone National Park year-round for enjoyment. Visitors would not be able to view animals in winter if snowmobile trails were closed.

Response: Alternatives 2, 5, and 6 would limit access to the park by closing roads to over-snow vehicles in winter, resulting in major adverse impacts on some winter park users. Alternative 2 would permit snowmobiles to enter the park at the south and east entrances for access to Old Faithful, a popular destination in winter. This alternative would result in closing 60 miles of roads to snowmobiles and would eliminate over-snow travel from West Yellowstone to Madison Junction and to points north and south from Madison. In addition, over-snow access from Mammoth Hot Springs south to Madison Junction would be eliminated. Alternative 2 would result in major adverse impacts on winter recreationists in the park, but would vary somewhat depending on visitors' satisfaction with alternative trails and access points. Alternatives 5 and 6 would result in plowing park roads currently left unplowed to permit transport of bison to and from capture facilities. During the years that areawide capture and slaughter were in effect, these alternatives would have major adverse impacts on winter park users. However, this would be a temporary effect, and the overall impact on snowmobile use would be minor to moderate. In addition, these alternatives do not propose closing the park to winter recreation. Visitors would be able to cross-country ski and snowshoe in the park, and the road segment from Mammoth Hot Springs to Cooke City would remain plowed, allowing visitors access to the Lamar Valley where they could view wildlife.

Representative Comment: 7502C, 15486B

B Comment: Commenters enjoy viewing bison when snowmobiling.

Response: As stated in the *Draft Environmental Impact Statement*, winter use of the park has been growing, nearly doubling in the decade from 1984 to 1994. In surveys of winter users conducted in 1989, 46% of the participants liked viewing scenery and 17% specifically identified wildlife viewing as what

they liked most about the park in winter (NPS 1990b). Alternatives 2, 5, and 6 would limit access to the park by closing roads to over-snow vehicles in winter, resulting in major adverse impacts on some users. These alternatives would limit snowmobilers ability to view bison. Results of the winter Greater Yellowstone Area visitor survey indicate that bison were ranked fifth on the list of animals visitors would most like to see in the Greater Yellowstone Area. Nearly 54% of respondents said that seeing bison was one of the reasons they made their trip to the Greater Yellowstone Area, and of this group, 12.1% said they would not have made the trip if bison were not present in Greater Yellowstone Area (NPS 1999a). Additional information on the relationship between bison viewing and visitors to Yellowstone National Park is included in volume 1, "Affected Environment: Recreation" and in this volume under "Socioeconomics: Nonmarket Values.

Representative Comment: 9051A

Issue 10: ***Impact of Snowmobiling on the Visitor Experience***

A Comment: Snowmobiling detracts from the "serenity and solitude" of the park.

Response: Impacts of snowmobiles on visitor experience is currently being addressed in the *Draft Winter Use Plan Environmental Impact Statement* which was released for public comment August through November 1999.

Representative Comment: 9382H

B Comment: Commenters supported alternative 7 because it preserves a safe means of transportation in the park in winter.

Response: Alternatives 1, 4, 7, and the modified preferred alternative place no restriction on winter recreation by closing roads to over-snow vehicle use or by plowing the roads. This would maintain the same safety level for winter recreational users that currently exists under the no-action alternative. Safety associated with winter recreation is addressed in the *Draft Winter Use Plan Environmental Impact Statement* (NPS 1999a).

Representative Comment: 14501B

C Comment: Need a snowmobile to enjoy the scenic beauty and majesty of the park because it is so large.

Response: See response above.

Representative Comment: 15436A

D Comment: Commenters would like to see a ban of off-road vehicles and snowmobiles.

Response: Although alternatives 2, 5, and 6 propose changes in current winter road maintenance by plowing roads currently left unplowed or closing roads to use in winter, only alternative 2 would restrict snowmobiles from the park. Types and levels of winter recreational use are being addressed in the *Draft Winter Use Plan Environmental Impact Statement* (NPS 1999a). Some winter recreational uses addressed in the alternatives include increasing or restricting winter recreational opportunities (increased grooming, plowing roads, closing road segments), developing stricter emission and noise standards to address air and sound concerns, and/or emphasizing wildlife protection.

Representative Comment: 1176C

Issue 11: ***Recreational Opportunities***

A Comment: Commenters opposed any final impact statement plan that limits recreational opportunities.

Response: Volume 1 acknowledges that recreational use would be affected under various alternatives. However, the larger question of winter recreation in and around the park is analyzed in the *Draft Winter Use Plan Environmental Impact Statement* (NPS 1999a). Alternatives 5 and 6 of this environmental impact statement would have the greatest effect on winter recreation use in the park due to the extensive network of plowed roads necessary to reach the capture facilities proposed inside the park.

Representative Comment: 12045A

B Comment: The acquisition of more land will provide more recreational opportunity.

Response: Recreational opportunities could increase if more land was acquired, depending on the terms of the acquisition. It should be noted that the federal government recently (1999) acquired approximately 6,000 acres of land north of Reese Creek. Alternatives 3 and 7 call for hunting in these acquired areas. Bison viewing would also be expected to occur in these areas during winter months, as bison move north across the Reese Creek boundary of the park in some years.

Representative Comment: 1539G

C Comment: The interests of outfitters that use the park and surrounding areas for various recreational activities, such as camping, fishing, backcountry horse packing, and hunting, should be protected.

Response: Recreation within the park and surrounding areas could be positively or negatively impacted as a result of actions proposed in the EIS alternatives. The impact on recreation is not only a concern of outfitters, but of general visitors to the park and surrounding areas. Actions proposed in the alternatives included changes in bison population numbers, modified winter road grooming, and the addition of bison hunting in areas surrounding the park. It should be noted that the National Park Service has an obligation to protect visitor experiences and provide positive opportunities within Yellowstone National Park.

Winter recreational use of Yellowstone National Park would be affected under alternatives 2, 5, and 6. In a 1999 winter survey of visitors to Yellowstone and Grand Teton National Parks, 61% of the respondents reported snowmobiling, 24.6% reported cross-country skiing, and 9.8% reported riding a snowcoach at some point on their trip to the Greater Yellowstone Area (NPS 1999a). Alternative 2 would likely affect over 50% of current winter over-snow visitors to Yellowstone National Park. It might be expected that displaced over-snow visitors would continue their activities on other roads and trails on lands adjacent to the park. Alternatives 5 and 6 would have a major negative impact on winter recreation during the three to four years of capture, test, and slaughter operations, because the west, north, and east entrances would be cut off from winter access. Again, visitors might then use other areas surrounding the park for winter recreational activities. Results of a survey of winter visitors to Grand Teton and Yellowstone National Parks indicated that most visitors (62%) participated in winter recreation, skiing, and snowmobiling outside the parks in places such as the West Yellowstone area; Big Sky, Montana; and Jackson, Wyoming (Littlejohn 1996).

Volume 1 provides updated information on the impacts to recreational users under the various EIS alternatives.

Representative Comment: 427K

Issue 12: ***Access to Yellowstone National Park***

A Comment: The park should be restricted to visitor use either by limiting the time they would be allowed to visit the park or to restrict them from areas where bison are present.

Response: Restrictions placed on visitor admittance to Yellowstone National Park are beyond the scope of this environmental impact statement. For visitor safety, current regulations prohibit visitors from approaching within 25 yards of any wildlife, including bison. Although park visitors may be restricted from areas of the park where bison management activities are occurring, none of the proposed alternatives place additional restrictions on visitors where bison may be located.

Representative Comment: 73B

B Comment: Access to the park should be protected for the benefit of local residents, tourists, and tourist-dependent businesses.

Response: If alternative 2, 5, or 6 was selected, access to the park would be eliminated or limited primarily during the winter, as roads that are currently groomed for over-snow vehicle use would be closed or plowed. Overall access to the park in summer would not be restricted; however, some areas inside the park might be restricted to visitor use due to management activities. New data concerning impacts on the regional economy from road closures are presented in volume 1, "Environmental Consequences: Impacts on Socioeconomics."

Representative Comment: 11058B

Winter Recreation (VU-45)

Issue 1: ***Incomplete Winter Socioeconomic Impact Analysis***

A Comment: The *Draft Environmental Impact Statement* fails to adequately address the adverse effects that eliminating snowmobiles and snow coaches will have on park visitors, concessions, gateway communities, recreational use, and other interests.

Response: Snowmobile use would be eliminated or limited if alternative 2, 5, or 6 was selected, primarily during the winter because roads that are currently groomed for over-snow vehicle use would be closed or plowed. New data concerning impacts on the regional economy from road closures are presented in volume 1, "Environmental Consequences: Impact to Socioeconomics."

Winter visitors to the park during the 1998–99 season were surveyed to determine how their visitation would be affected by closing roads to all vehicular traffic from Mammoth to Madison, West Yellowstone to Madison, and Madison to Old Faithful from November 1 to April 30. Based on the responses to this survey question, visitation to the Greater Yellowstone Area by winter visitors who live outside of this area would be reduced by 24.9% if these roads were closed. It is estimated that total economic output in the 17-county Greater Yellowstone Area would be reduced by $13,750,000 as a result of these travel restrictions. This estimated loss in output would be a minor impact on the overall $12.7 billion economic output of the Greater Yellowstone Area. This impact would likely be concentrated in small communities adjacent to the park. These communities would bear a disproportionately large share of the expenditure reductions. Travel restrictions would have a major negative impact on the winter economies of adjacent communities, such as West Yellowstone and Gardiner. However, the estimated reductions in local area spending could be lessened if users not currently recreating in the park during the winter chose to come to the park because of new restrictions on motorized users.

While winter recreation and the associated visitor expenditures are substantial within the Greater Yellowstone Area, in the context of total annual recreation-related expenditures in this area, winter recreational expenditures would be far less important than expenditures made during the nonwinter months. Only 4%–5% of total annual recreational visitation to Yellowstone National Park occurs in the winter months of December through March.

Representative Comment: 14978B, 15431A

Issue 2: ***Winter Use Economics***

A Comment: The gateway communities, such as West Yellowstone, enjoy the large crowd of visitors during both the winter and summer months. Restrictions to snowmobiling would severely impact their economy.

Response: New data concerning impacts on the regional economy from road closures are presented in volume 1, "Environmental Consequences: Impact on Socioeconomics." See also "Visitor Use: Overall Visitor Use and Experience — Issue 12 (Access to the Yellowstone National Park) " in this volume.

Representative Comment: 12048C, 10348D, 15383C

Issue 3: ***Winter Park Accessibility***

A Comment: Consider that winter access to the park for handicapped, senior citizens, or the very young would be limited by changes to snowmobile access to the park.

Response: Although alternatives 2, 5, and 6 propose changes in current winter road maintenance by plowing roads currently left unplowed or closing roads to use in winter, only alternative 2 would restrict snowmobiles from the park. Types and levels of winter recreational use are being addressed in the *Draft Winter Use Plan Environmental Impact Statement* (NPS 1999a).

Representative Comment: 6947A

Issue 4: *Winter Use Economics*

A Comment: The socioeconomics favor increased bison herds. Closing snowmobile trails would cause a $656,000 to $2 million revenue loss, while increased bison viewing opportunities would generate about $20 million/ year in additional revenue. The increased wildlife viewing opportunities resulting from alternative 2 will more than offset any losses to local communities due to closing snowmobile roads.

Response: The $20 million referred to in the comment was an estimate of the increase in visitor expenditures in the Yellowstone area by visitors drawn to the area to view wildlife. This estimate was based on impacts associated with wolf recovery, as no data existed on the impacts that changes in bison numbers would have on visitor expenditures. Based on new survey results, the change in viewing benefits associated with changes in the bison population for the various alternatives is likely to be quite small. While wildlife viewing is the single most common activity engaged in by summer visitors to Yellowstone National Park, the issue of whether the bison population changes described in the *Draft Environmental Impact Statement* would lead to measurable changes in how visitors to the park value their visits is not so clear. Responses to a 1999 summer survey of park visitors did not show any systematic relationship between the number of bison seen by visitors on their trips and the value they ascribed to their trip. The lack of such a statistical relationship is likely due to the fact that nearly all (97%) summer visitors responding to the survey had seen bison on their trips. In addition, most visitors had seen a relatively large number of bison. Therefore, although alternative 2 would result in greater bison viewing opportunities in the Greater Yellowstone Area, the extent of increased visitation or visitor expenditures is unknown. New data concerning impacts on the regional economy from bison viewing and road closures are presented in volume 1, "Affected Environment: Recreation — Wildlife and Bison Viewing," and "Winter Recreation"; in this volume, "Socioeconomics: Nonmarket Values — Issue 1."

Representative Comment: 10540H, 10279I

Issue 5: *Snowmobiling Fees*

A Comment: Snowmobilers and related business communities should provide funds for purchasing conservation easements and/or critical lands that support the migrating bison herd.

Response: The agencies appreciate efforts by interested people with differing interests to work together on matters related to bison management. The agencies do not have the authority to make decisions that are predicated on the assumption that private citizens will participate in voluntary programs.

Representative Comment: 15294H

B Comment: Increase fees for snowmobile use and use the revenue to pay for bison winter forage.

Response: Entrance fees to the national parks are approved by the U.S. Congress, and any changes to those fees would need to go through a congressional approval process.

Representative Comment: 15074D

Issue 6: *Winter Use Policy*

A Comment: Clarify whether snowmobiling and trail grooming in Yellowstone can legally be permitted under the National Park Service Organic Act. Snowmobile use is inconsistent with preserving nature in an unimpaired condition because it disturbs wildlife and damages resources.

Response: Legal and policy issues regarding snowmobile use within national parks is addressed in the *Draft Winter Use Plan Environmental Impact Statement* (NPS 1999a). The National Park Service does

have the authority to manage park resources, including wildlife, which is why some of the alternatives in this environmental impact statement incorporate reduced or eliminated snowmobile access as a bison management tool.

Representative Comment: 11532C, 15372P, 14556G, 1404I

Issue 7: *Winter Use Policy and NEPA Compliance*

A Comment: The decisions made in the bison environmental impact statement should not affect the winter use plan, and if there is overlap, the *Winter Use Plan Environmental Impact Statement* should have precedent.

Response: The final environmental impact statement updates information regarding the *Draft Winter Use Plan Environmental Impact Statement* and its relationship to the environmental impact statement for the bison management plan. See volume 1, "Purpose of and Need for Action: Introduction — Other Ongoing Planning Efforts" for more information.

Representative Comment: 7262A

Issue 8: *Winter Use Studies and Data*

A Comment: All alternatives, not just 2 and 3, need to include provisions for gathering data on the effects of winter road grooming inside Yellowstone National Park.

Response: As stated in the "Actions Common to All Alternatives" section of the *Draft Environmental Impact Statement* (p. 54–60), research is currently underway to study bison use of winter groomed roads and will continue during the implementation of the selected management alternative. In an effort to better understand bison movements and the use of the winter groomed road system, managers have instituted studies that address this issue. It is the intent of the agencies to continue research and monitor bison use of groomed roads no matter which alternative is chosen for implementation.

Representative Comment: 11409aCC

B Comment: Winter groomed trails may encourage bison and other wildlife to leave the park and grooming should be substantially reduced or stopped until research is done to determine how bison and other wildlife use these trails. Other comments suggested closing the roads only if research indicated that bison are indeed using the roads to exit the park.

Response: While groomed roads may have contributed to the redistribution of bison within park boundaries, it appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and much of their movement toward park boundaries may occur on such routes. Monitoring bison movements in the Hayden Valley and Mammoth to Gibbon Falls sections of the park has found that less than 12% of bison movements occurred on the groomed road surface (Kurz 1998, 1999b). However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas. Westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, thereby possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (refer to volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 11124I, 13393C

Issue 9: ***Incomplete Winter Use Studies and Data***

A Comment: Do any studies exist that document negative impacts from snowmobile use or trail grooming on wildlife, including bison and other wildlife in Yellowstone.

Response: The impacts of winter recreation on wildlife in Yellowstone National Park have been fairly well documented. Studies have been published that document winter recreation effects on wildlife behavior and survival, including the bison use of groomed snowmobile trails (Aune 1981) and groomed trail effects on changes in bison movements, habitat use, distribution, and calf survival (Meagher 1993). Yellowstone elk have been affected by cross-country skiers (Aune 1981, Cassirer et al. 1992) and in Yellowstone, snowmobilers and cross-country skiers have caused most trumpeter swans to fly (Shea 1979). Elsewhere in Montana and Wyoming, published literature documents that snowmobile use has impacted deer, elk, and small mammals (Aasheim 1980), bald eagles (Shea 1973, Alt 1980, Skagen et al. 1991, Harmata 1996) and bighorn sheep (Berwick 1968). There is no apparent reason to expect that similar effects would not occur in Yellowstone, where winter conditions are generally more severe and the intensity of snowmobile usage is generally higher than elsewhere in Montana and Wyoming.

Representative Comment: 10335D, 14884B, 1063C, 15479A, 230E, 15470D, 8915D

B Comment: The *Draft Environmental Impact Statement* failed to use the National Park Service report on winter recreation by Dr. James Caslick that surveyed over 300 studies on the impacts of winter recreation on wildlife and recommended a no-snowmobiling alternative.

Response: The environmental impact statement used a number of sources that are contained in the report by Dr. Caslick when formulating the alternatives and in assessing the possible impacts of implementation. The recommendation in Dr. Caslick's report for a no-snowmobiling alternative was only one part of a recommendation for the preparation of an environmental impact statement on winter visitor use as part of an overall visitor use management plan for the park. The recommendations contained in Dr. Caslick's report were also considered when developing the alternatives for the bison management environmental impact statement.

Representative Comment: 14700N

C Comment: The *Draft Environmental Impact Statement* failed to disclose all relevant information about, or to properly assess the impacts of, snowmobiles and trail grooming on Yellowstone National Park bison.

Response: In preparation of the *Draft Environmental Impact Statement*, the agencies evaluated all of the available literature on this subject. Since the publication of the draft statement, new research has been initiated to further investigate the relationship between bison and the winter groomed road system. The preliminary results of this research have been used in the preparation of the final environmental impact statement and will also be considered during future evaluations of the alternative chosen for implementation.

Representative Comment: 14714FF

Issue 10: ***Winter Road/Trail Grooming***

A Comment: Would the early closure of groomed roads to snowmobiles affect bison outmigration?

Response: Early closure of groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, thereby possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads might not impact bison movements and distribution. Research is currently being conducted to better understand

the relationship between road grooming and bison movement and distribution patterns (refer to volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 15543X, 15316P

B Comment: Winter road grooming should be discontinued or altered because it has disrupted bison population dynamics, distribution, and survival by allowing bison to access new areas within and beyond Yellowstone National Park. Other comments stated that the cessation of grooming would have no effect on bison movement, as bison would simply use riparian corridors and other trails to access these foraging areas.

Response: While groomed roads may have contributed to the redistribution of bison within park boundaries (Meagher 1997), it appears that bison tend to use waterways and off-road trails for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward park boundaries may occur on such routes. Monitoring bison movements in the Hayden Valley and Mammoth to Gibbon Falls sections of the park has found that less than 12% of bison movements occurred on the groomed road surface (Kurz 1998, 1999b). However, groomed roads may have allowed larger numbers of bison to exist in the park than in the absence of groomed roads by allowing access to otherwise unavailable foraging areas. Westward redistribution early in the winter may predispose some bison to exit the park (Meagher 1997). Therefore, closing groomed roads could have the effect of reducing population size and shifting distribution back to patterns observed before grooming, thereby possibly reducing the magnitude of bison movements outside park boundaries. Conversely, bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements and distribution. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (refer to volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 9382H, 104D, 15316O, 1004F, 10322G, 10347B, 15451B, 15435C, 10678A, 1303F, 11068C, 10849D, 10412C, 14373aU

C Comment: More options for closing specific groomed trails should have been presented in the *Draft Environmental Impact Statement*.

Response: In developing the alternatives, it was necessary to evaluate the impacts of a wide range of management options. The specific groomed roads considered for possible closure in some of the alternatives were those that would be most likely to have some influence on the movement of bison toward the park boundaries. Additional road segments were not considered because their closure would not likely affect bison movement.

Representative Comment: 90F

D Comment: Do not groom existing roads, and use old stagecoach roads and powerline corridors as alternative routes for snowmobile access from West Yellowstone, in an effort to stop bison from moving beyond the park boundary.

Response: See issue B above in this section.

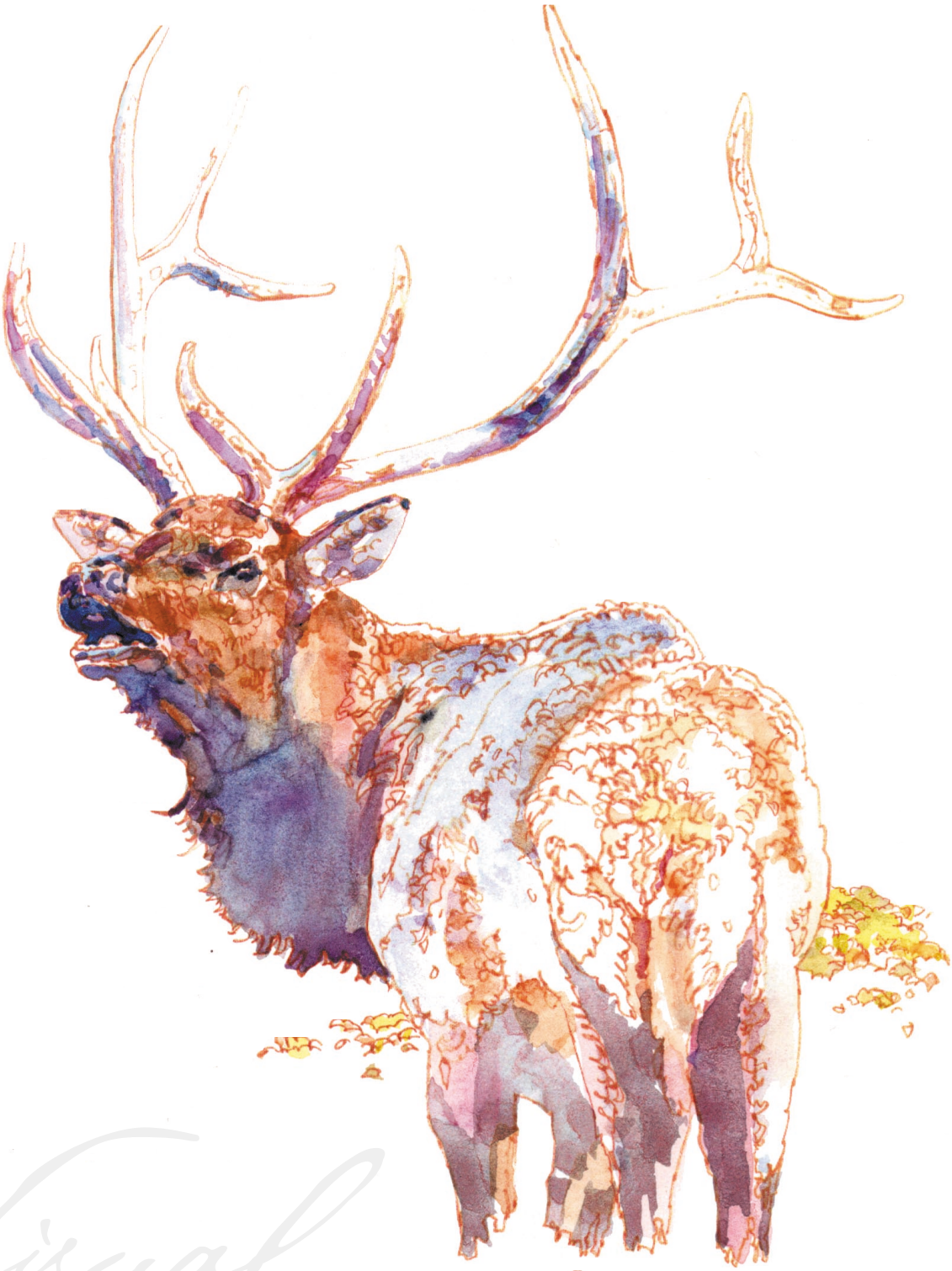
Representative Comment: 15316V

E Comment: The National Park Service should groom roads to seeded areas where animals could find grass to eat and thus be limited from out-migrating from the park.

Response: Seeding bison winter range areas with late season grasses is unnecessary, as adequate forage resources are already present in these areas. Singer et al. (1998) recently published an assessment of natural regulation in Yellowstone National Park, and there was no widespread evidence of overgrazing

observed in study sites with vegetation communities that comprised about 97% of the winter range. The 1998 NAS states that bison killed outside the park in the winters of 1991–92 and 1996–97 were in excellent body condition with more than adequate body-fat stores. The report concluded, "Thus, there is little evidence of inadequate forage or quality available to Yellowstone National Park bison." In the areas immediately adjacent to Yellowstone National Park, specifically Eagle Creek/Bear Creek, Reese Creek, and the Horse Butte area, the U.S. Forest Service has determined that there are 17,225 acres of land available for use by large herbivores. These areas provide approximately 6.7 million pounds of dry weight forage available for large herbivores. These areas, at present, do not come close to having available forage consumed by any combination of wildlife species and livestock that are using the area.

Representative Comment: 2849H



Visual

resources

Landscapes and Viewsheds (VR-47)

Issue 1: ***Impact of Marking Bison on Visual Resources***

A Comment: Marking bison with paint, tags, or peroxide would adversely impact visitors who wish to view and photograph wild bison. The markings would degrade the views of free-roaming bison.

Response: In all alternatives (including phase 1 of alternative 2), the appearance of bison would be altered due to tagging or marking. Under the modified preferred alternative, however, marking and tagging of bison is expected to occur less frequently. During step 3 of the modified preferred alternative, there is the potential for less capture and handling of bison, and untested bison would be able to occupy lands beyond park boundaries to the west and the north, thus reducing the need to mark them. Marking and tagging bison are associated with the management activities of capture and testing. Bison could be marked with ear tags, paper back tags, or paint/peroxide stripes to indicate they have tested negative for the brucellosis or have been vaccinated. Tagging and marking associated with capture facilities could be done between November and April. In capture and testing procedures, all bison in capture facilities on both the western and northern boundaries receive a small metal ear tag when they are tested for the *Brucella abortus* organism. Brown and silver tags will most likely be used and are difficult to detect due to the long hair in the bison ear. Additional markings currently used to identify bison that test negative for the *brucella* organism differ according to agency and location. The marks are often visible until the bison shed the winter coat in the spring.

On the western park boundary, a variety of marking techniques is currently being used by Montana Department of Livestock. Bison that are determined to be seronegative may be marked with a paint/peroxide stripe, back tags, and clipped hair (Dr. A. Gertonson, Montana State Veterinarian, pers. comm.). Using all three methods increases the probability of one or more of the identification marks being visible in adverse weather conditions. The paint/peroxide stripes are created using both paint and a peroxide or hair-dye mixture. The stripe, which is approximately 2 to 4 inches wide, is applied over the shoulder or hip of the bison. The mark is visible from 100 yards or farther, for varying lengths of time, depending on weather conditions Seronegative bison may also receive a paper back tag and 3 to 4 inches of hair may be clipped over the shoulder. The back tags are approximately 3 by 4 inches, white or yellow, oval-shaped paper tags with a number and are attached to the hair with glue. The paper back tags stay attached for varying lengths of time, depending on weather conditions. The visibility of the clipped hair mark varies, depending on the shade of the hair. The mark is more visible when the hair shade is dark, as opposed to light.

On the northern boundary, some seronegative bison that are released in spring may have paper back tags. Bison that are vaccinated, when a safe and effective vaccine is available, would also require a mark or tag. Bison vaccinated within capture facilities would receive a metal ear tag. Any bison that have tested negative for brucellosis or have been vaccinated by remote delivery system (e.g., dart, biobullet) could be marked by paint ball.

In Wyoming, paint ball marking is used as part of the remote delivery vaccination program used on elk on feed grounds. The purpose of paint ball marking is to prevent managers from vaccinating the same animal more than once. The remote delivery system currently used in Wyoming requires an air gun that is fitted with two barrels and two triggers. One trigger and barrel releases a biobullet containing a vaccine, and the other trigger and barrel releases the paint ball. Oil based paint is used and will last approximately two to six weeks, depending on weather conditions. The marks disappear when the animal sheds its winter coat in the spring (Tom Thorne, Wyoming Game and Fish Department, pers. comm.). Marking methods such as those used on the western boundary are highly visible and considered to be a major adverse impact to the visitor experience. These marks are temporary and only present on the animals until they shed their winter coats in early spring. Therefore, the impact on the visitor experience is short term. The marking of bison on the northern boundary with only paper backtags is considered a moderate negative impact on the visitor experience, since they are less conspicuous than paint/peroxide stripes. These marks can be present on the animals until spring when the winter coat is shed, resulting in a short-term impact on visitor

experience. Although these tags are visually intrusive, they are necessary to minimize the need to capture and handle the bison more than once to determine its brucellosis status.

Representative Comment: 3059J, 1302L, 5854H

B Comment: By marking bison, people may not be as inclined to spend money to view bison or to buy products that are associated with them.

Response: Under all alternatives the appearance of bison would be altered due to tagging/marking. Under the modified preferred alternative, however, marking and tagging of bison is expected to occur less frequently. During step 3 of the modified preferred alternative, there is the potential for less capture and handling of bison, and untested bison would be able to occupy lands beyond park boundaries to the west and the north, reducing the need to mark them. Bison would be marked with visible ear tags, paper back tags, or paint/peroxide stripes to indicate they have tested negative for the *B. abortus* organism. Tagging and marking will detract from the natural appearance of bison, resulting in a short-term moderate to major adverse impact on visitor experiences. Because marking and tagging of bison occurs concurrently with capture and testing, these activities could take place between November and April. The paper back tags and marking are all expected to disappear by the time bison shed their winter coats in early spring, therefore winter users of the park would be most impacted by the marking. It should be noted that only 4%–5% of total annual recreational visitation to Yellowstone National Park occurs from December through March (NPS 1999a). Therefore the expected impact of marked or tagged bison on the tourist industry in and outside Yellowstone National Park is expected to be minimal.

Representative Comment: 3698F

C Comment: Use relatively unobtrusive markings, such as small ear tags or paint on the horns that does not contrast greatly with these animals.

Response: All alternatives involve the process of monitoring and vaccinating bison that would change their appearance. Under the modified preferred alternative, however, marking and tagging of bison is expected to occur less frequently. During step 3 of the modified preferred alternative, there is the potential for less capture and handling of bison, and untested bison would be able to occupy lands beyond park boundaries to the west and the north, reducing the need for marking. The ear tags that would be used to indicate that the bison had tested negative for *B. abortus* are small and considered to be visually unobtrusive. The visual markers used to identify bison that have tested negative or that have been vaccinated are more obvious. The paint/peroxide stripes, hair-clipped patches, and paper back tags, along with the paint-ball marks that could be used when vaccinating, are temporary markers that either fall off the bison or are shed from the coats. Therefore, this type of marking would be a short-term, moderate to major adverse impact on visitors interested in seeing bison. The purpose of the visible marking is so management officials can see from a distance the bison that have tested negative for brucellosis. The visible marking helps eliminate the need for animals to be handled more than once in a season. See "Visitor Use: Overall Visitor Use and Experience — Issue 3."

Representative Comment: 11409ANN

D Comment: Visual impacts associated with the hazing, shooting, and gutting of bison were not assessed in the *Draft Environmental Impact Statement*.

Response: The impacts of hazing, shooting, and gutting bison were addressed in the *Draft Environmental Impact Statement*, "Affected Environment: Visual Resources" section and also summarized in table 12, p. 125–133. Common to all alternatives, agency shooting of bison and some hazing operations would be visible if bison venture beyond delineated SMAs. The management activities would have a minor to major visual impact on the landscape and for some viewers who might be opposed to the shooting or hazing of bison or to those viewers sensitive to these activities. The modified preferred alternative might provide for

less capture and handling of bison during step 3, which would be considered a minor positive benefit for some viewers opposed to such activities.

Representative Comment: 8967C

Issue 2: ***Impact of Management Facilities on Visual Resources***

A Comment: Capture facilities, corrals, and holding pens with bison should not be erected inside the park. They would detract from the natural scenic values of the park, adversely impacting visitor experience.

Response: Capture facilities are considered to be visually intrusive on the landscape. However, they are necessary to adequately test bison for brucellosis. As stated in volume 1, "Environmental Consequences: Impacts on Visual Resources," the presence of capture facilities is expected to have a minor to moderate negative impact on the natural vista associated with alternatives 1, 4, and the modified preferred alternative. These alternatives would leave the existing structures at Stephens Creek and West Yellowstone. The Stephens Creek facility is not readily visible to the majority of visitors to the park. The facilities on the western boundary would not be visible in major viewsheds, but some visitors to the park or the national forest and area residents would see them. Alternatives 5 and 6, which propose eight capture facilities in various locations within the park, are expected to have a short-term major impact on natural vistas. The proposed areas would be highly sensitive to visual intrusion, and while measures would be taken to minimize impacts, the presence of these facilities would be highly visible. Alternative 6 would result in a major adverse impact from a permanent capture and testing facility at Seven-Mile Bridge. Alternatives 2, 3, and 7 propose the dismantling of capture facilities at Stephens Creek and West Yellowstone, which would restore the visual scene to more natural conditions. Alternatives 3 and 7 would result in the relocation of capture facilities outside the park, which would result in minor to moderate impacts on the visual resources of these areas.

Representative Comment: 2443C

Issue 3: ***Wildlife Impacts on the Landscape***

A Comment: Do not manage wildlife in such a way that they concentrate in the thermal areas during winter where they will cause damage.

Response: The cooperating agencies are not managing bison so they concentrate in thermally influenced areas. Some bison use thermal areas in late winter and early spring when snow depths prohibit accessibility to forage. However, alternative 5 and phase 2 of alternative 6 propose to construct eight capture facilities inside the park. The objective of these two alternatives is to capture, test, and vaccinate all park bison, which may result in large concentrations of bison in small areas, possibly including sensitive thermal areas. The concentration of bison and associated management activities such as hazing and rounding-up of bison into the capture facilities could adversely impact some thermal features. Because the capture facilities would be used for three to four years, the impacts to thermal areas could be substantial. Little information exists pertaining to the flora and fauna of thermal areas, and recovery from disturbance is unknown.

Representative Comment: 10537D

Issue 4: ***Visual Resources and Scenic Value Impacts***

A Comment: The *Draft Environmental Impact Statement* failed to address the impacts on the visual or scenic character that are a nationally recognized cultural resource of the Yellowstone Park system.

Response: The "Affected Environment" and "Environmental Consequences" parts of the *Draft Environmental Impact Statement* discussed Yellowstone National Park, Gallatin National Forest, other public lands, and surrounding communities (essentially the greater Yellowstone area) from a variety of

perspectives, including the visual or scenic character. This included the examination of the prehistoric and historic record, archeology, historic structures, ethnographic resources, cultural landscapes, and viewsheds, as well as visual resources and visual qualities within public lands. In addition, the park has the following projects underway or scheduled for the immediate future. An archeological inventory of the northern range of the park is scheduled to begin in 2001. A three-year parkwide inventory of the parks 1,000+ structures is scheduled for completion in fiscal year 2000. A level zero park reconnaissance survey is underway and priorities for level one inventories in 1999 and 2000 are currently being identified. The parks "Ethnographic Overview" by Nabokov and Loendorf is in final draft. Subsequent projects that have been identified include a traditional use study, an ethnographic resources inventory, an American Indian consultation plan, an ethnographic landscape survey, and a collection of ethnographic oral histories.

Representative Comment: 11416C

Issue 5: ***Rural Agricultural Setting***

A Comment: Historical and agricultural influences have affected the visual resource, and the current proposals will have an adverse impact on the visual resource.

Response: The park continues to gather information that will assist in developing a better understanding of existing resources and their condition, as well as the context in which those visual resources have been affected in the past and how they may be affected by future proposals. A level zero park reconnaissance survey is currently underway, and priorities for level one inventories in 1999 and 2000 are being identified. A three-year parkwide inventory of 1,000+ structures is scheduled for completion in fiscal year 2000. Once this type of information is available, it will be possible to more fully assess any impacts associated with the current proposal on the visual resource.

Representative Comment: 14829C

wildlife

Brucellosis in Other Wild Ungulates (WI-21)

Issue 1: ***Management of Bison vs. Elk and Other Species***

A Comment: Bison should be managed as are elk and other wildlife, since other species also carry and can transmit brucellosis. The type of intensive management proposed for bison in the *Draft Environmental Impact Statement* will set a precedent for other brucellosis-affected wildlife, such as elk.

Response: The agencies are committed to managing bison as other wildlife are managed, recognizing that, unlike for other wildlife, a major component of bison management is related to the management of risk of disease transmission to cattle. As with other wildlife, tolerance for bison on private lands and potential private property damage are also components of bison management. Additionally, the agencies have agreed that one of the objectives of the plan is to "clearly define a boundary line beyond which bison will not be tolerated" (see volume 1, "Purpose of and Need for Action: Objectives and Constraints"). According to 1998 NAS report, elk are the only other species of concern in the Greater Yellowstone Area with respect to the risk of transmission of brucellosis to cattle. The low seroprevalence rate of the northern Greater Yellowstone Area elk herds (1%–2%), despite occasional seasonal concentrations that result in densities similar to those found on winter feeding grounds, suggests that the risk of transmission from northern Greater Yellowstone Area elk to cattle is lower than that from bison (NAS 1998). Therefore, elk in the Montana portion of the Greater Yellowstone Area are not considered to present enough of a risk of transmission to warrant risk management actions such as those being proposed for bison. (See responses in "Bison: Brucellosis Transmission and Public Perception — Issue 5A.")

Representative Comment: 2031A

B Comment: The only reason elk are not considered in the management of brucellosis is that they provide a source of financial gain to Montana and its residents.

Response: The agencies recognize that elk are an important source of recreation, in terms of hunting and of viewing opportunities, in the Greater Yellowstone Area, and that elk-related hunting and tourism activities are an important source of revenue in this area (NAS 1998). Nevertheless, as stated in the response to issue 1A above, the agencies do not propose management actions for elk similar to those of bison because elk are not considered to pose similar risk of transmission of brucellosis to cattle in the area covered by this plan.

Representative Comment: 230C

Issue 2: ***Additional Analysis, Data, Information, or Other Changes***

A Comment: The agencies should commit to a research and monitoring program that will gather information on the incidence and distribution of brucellosis in the Greater Yellowstone ecosystem wildlife, and will assess any real or actual risk of brucellosis transmission from any source, including bison and elk.

Response: The 1998 NAS report represented an important first step in gathering and analyzing available data pertinent to the brucellosis issue. The investigators interviewed scientists and agency personnel, as well as reviewed published literature and reports on subjects including the incidence of brucellosis infection in bison, elk, and other species; population and behavioral data of those species relevant to interspecific transmission potential; availability and effectiveness of vaccines; and likely success of various control and eradication methods. In this report the investigators made numerous recommendations as to research needed to clarify many of these issues. The agencies are committed to pursuing a variety of research projects to better understand brucellosis in wildlife and the risk of transmission to cattle. Refer to volume 1, appendix D for a complete listing of brucellosis/bison/elk information needs and research topics that are recognized by the agencies as important to the brucellosis management issue. For example, the modified preferred alternative calls for the use of telemetry to monitor seronegative pregnant female bison in areas outside Yellowstone National Park. This would allow the agencies to closely monitor birth

events and birth sites as well as determine other important information regarding seronegative bison. The table in Appendix D lists ongoing projects, proposed projects, and needs that are not yet being addressed. (Also see responses in this volume under "Bison: Brucellosis Transmission and Public Perception — Issues 4A–4E.")

Representative Comment: 2970A

B Comment: The *Draft Environmental Impact Statement* failed to discuss the seroprevalence of brucellosis in elk, the transmission of brucellosis between elk and bison, and elk and cattle, and whether elk are expected to stay within SMA boundaries. The *Draft Environmental Impact Statement* also failed to evaluate whether elk, in comparison to bison, pose similar, greater, or lesser risks to cattle because of their greater population size, behavior at calving or abortion events, and distribution.

Response: The "Purpose of and Need for Action: Background" section in volume 1 of the final environment impact statement provides some basic information about seroprevalence rates in Greater Yellowstone Area elk and other wildlife. The original text has been changed to include additional information regarding seroprevalence rates and what is known about the risk of elk transmitting brucellosis to cattle in the area of consideration for this plan.

Representative Comment: 14714T

C Comment: The only cases of probable wildlife transmission to cattle were from elk east of Yellowstone National Park, and from elk to horses in Wyoming. Other commenters stated that the *Draft Environmental Impact Statement* (p. 20) is incorrect in stating that transmission occurred from elk to cattle, citing the NAS report (1998, p. 45).

Response: The text in the *Draft Environmental Impact Statement* (p. 20) has been changed to clarify the role of wildlife in the cattle brucellosis cases referred to. Between 1961 and 1989, six cases were reported in which cattle in the Greater Yellowstone Area became seropositive after having previously tested negative. Two of these cases led to a lawsuit by the livestock producer against the U. S. government for failing to control movements of elk from the National Elk Refuge onto private lands (*Parker vs. USA* and *Peck vs. USA* 1992). The court opined that the brucellosis in the cattle herds likely originated through contact with infected elk or bison, probably elk given the proximity of infected elk on winter feeding grounds managed by the state of Wyoming. Subsequent examination of all six cases determined that evidence pointing to infection by elk or bison was ambiguous at best, and that it was equally plausible that these cases represented residual outbreaks common in the course of brucellosis eradication efforts (NAS 1998). Therefore, due to the lack of clear evidence, "wildlife cannot be determined to be the source of brucellosis infection in these six cases" (NAS 1998). One case of confirmed brucellosis was reported in a horse that had contact with elk on a winter feeding ground in Wyoming. Another case, in which a horse developed symptoms of brucellosis after contact with a hunted elk carcass, was not confirmed, possibly because the horse had been treated with antibiotics prior to being tested (NAS 1998).

Representative Comment: 958B

Issue 3: ***Ability to Meet Objectives***

A Comment: The preferred alternative cannot meet the objective of working toward eventual elimination of brucellosis from the Greater Yellowstone Area (objective 4) in the absence of any plan to eliminate it in elk, because elk will simply reinfect the bison. In order to eradicate brucellosis from the Greater Yellowstone Area, vaccines must be developed for use at elk feeding grounds, and the feeding grounds must be eventually phased out. The agencies must review the debate over the effectiveness of the long-term elk vaccination program in Wyoming, and incorporate that information into the environmental impact statement. Commenters also stated that the *Draft Environmental Impact Statement* failed to evaluate the impact of infected elk on the likelihood of success of the alternatives, and some commenters

stated that alternatives 5 and 6 should be eliminated since the presence of brucellosis in elk renders eradication in the bison population impossible.

Response: Please refer to the revised text in volume 1, "Purpose of and Need for Action: Background — Brucellosis In Cattle and Bison (Brucellosis in Other Wild Ungulates)." Although one of the objectives of the management plan is to "commit to the eventual elimination of brucellosis in bison and other wildlife" (DEIS, p. 29), the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of this management plan." While some alternatives (alternatives 5 and 6) contain elements that take more extreme measures to remove seropositive animals, the agencies recognize that the presence of brucellosis in elk in the southern Greater Yellowstone Area may result in reinfection of the Yellowstone bison population should management actions such as those described in alternatives 5 and 6 result in major reductions of brucellosis in Yellowstone bison (NAS 1998). Because elk in the Montana portion of the Greater Yellowstone Area have a relatively low seropositivity rate (1%–2%), they are not considered to present a significant risk of transmission to cattle (NAS 1998). Questions exist as to the source of the low-level presence of brucellosis in the northern range elk: whether positive-testing elk are immigrants from the southern Greater Yellowstone Area herds, or whether infection is maintained by contact with southern Greater Yellowstone Area elk, by contact with bison, or simply maintained within the elk herd after some initial infection event (NAS 1998). If, as some contend, brucellosis in northern Yellowstone elk is being maintained only through contact with bison, it is then likely that elk may not reinfect a brucellosis-free bison herd, and in fact, brucellosis may subsequently disappear from the northern elk herds. Given the low seropositive rate in northern elk herds, it is also possible that the bison population may remain uninfected by elk for quite some time before the low-probability event of a transmission from elk to bison (NAS 1998). Questions about the origin and maintenance of brucellosis in the northern elk herds, the degree of contact between northern and southern Greater Yellowstone Area elk and bison herds, and the probability of transmission from bison to elk will all need to be addressed in any future planning efforts that specifically attempt to permanently eliminate brucellosis from any wildlife in the Greater Yellowstone Area. The role that vaccination of elk may play in that issue, as well as discussions about brucellosis management in the southern Greater Yellowstone Area will need to be investigated as part of those separate planning processes. The agencies are committed to researching the safety and efficacy of vaccines that may be used in bison prior to authorizing their use under any alternative. All alternatives contain actions that would further reduce the already small risk of transmission to cattle, as well as measures to reduce seroprevalence rates in bison.

Representative Comment: 11409AX

B Comment: Commenters questioned whether the plan's purpose really is to manage brucellosis, since this is contradicted by the fact that elk are also carriers of the bacteria, but the plan does not address their management.

Response: The stated purpose of the plan is not to manage brucellosis in the Greater Yellowstone Area, but to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana." (DEIS, p. 11). Although one of the objectives of the management plan is to "commit to the eventual elimination of brucellosis in bison and other wildlife" (DEIS, p. 29), the agencies have agreed that "the elimination of brucellosis, even in bison, is not within the scope of this management plan." Please refer to information on brucellosis in elk contained in the revised (volume 1, "Purpose of and Need for Action: Background — Brucellosis in Cattle and Bison (Brucellosis in Other Wild Ungulates)." Although the transmission of brucellosis from elk to cattle is of concern in the southern portion of the Greater Yellowstone Area because of the high seroprevalence rates of elk that winter on feedgrounds there, transmission from elk in the area of consideration by the plan is of much less concern. Elk in the northern range herd have been found to have a seroprevalence rate of approximately 1%–2% (NAS 1998). Because of this low seropositivity rate, and distribution and behavioral differences between elk and bison, elk in the area that the plan addresses are not considered to present enough of a risk of transmission to warrant risk management actions such as those being proposed for bison. Separate discussions and planning efforts are underway to address the issue of high seropositivity in southern Greater Yellowstone Area elk herds and

the risk they present of transmitting brucellosis to cattle. See responses concerning class-free status in "Livestock Operations: Cattle — Brucellosis Class-Free Status" in this volume.

Representative Comment: 171C

C Comment: Alternative 7 would not be able to meet objective 5 as stated in the *Draft Environmental Impact Statement*.

Response: Objective 5 states that each alternative must "protect the state of Montana from risk of reduction in its brucellosis status" (DEIS, p. 29). This objective was interpreted by the agencies to mean that each alternative must maintain Montana's brucellosis class-free status as conferred by APHIS. The agencies agreed that every alternative in the environmental impact statement must meet every objective in order to be considered (DEIS, p. 51). All the agencies, including APHIS, agreed that alternative 7 met objective 5. The modified preferred alternative contains additional measures that would assist in further protecting Montana's brucellosis class-free status. APHIS has committed to consult with states that threaten to pose sanctions against Montana and convince those states that sanctions are unwarranted. Under this alternative, APHIS would also add measures to certify particular cattle herds that might occupy the impact area as brucellosis-free. Please refer to responses in this volume to "Livestock Operations: Cattle — Brucellosis Class-Free Status," particularly responses under issue 9.

Representative Comment: 14356P

D Comment: Alternative 6 is flawed because its success is predicated on the success of efforts to control brucellosis in Wyoming elk, but the agencies have declared brucellosis in elk and its total eradication beyond the scope of this planning effort (*Draft Environmental Impact Statement*, p. 99).

Response: As presented, the objectives of alternative 6 are not predicated on the success of brucellosis control efforts in Wyoming elk or on eradication of brucellosis from wildlife in the Greater Yellowstone Area, but on the development of a safe and effective vaccine for brucellosis in bison and on the application of subsequent test and slaughter operations throughout Yellowstone National Park. Refer to the response to issue 3A above regarding the ability of the alternatives to meet stated objectives. Also refer to responses in this volume under "NEPA: New Alternatives/Issues."

Representative Comment: 14819M

Issue 4: *Control/Eradication of Brucellosis*

A Comment: Since other mammals existing at greater population densities than bison also carry brucellosis, control methods such as hunting, predation, and vaccination should be developed that are applicable to each species; a wide variety of animals apparently carry brucellosis, and efforts to eradicate brucellosis in bison should not begin until viable plans are developed to eradicate it in other species that carry it.

Response: Refer to the DEIS, (p. 18). Brucellosis occurs at extremely low frequency in Greater Yellowstone Area ungulates other than elk and bison, and therefore they are not considered to be a risk for transmission to cattle or reinfection of bison or elk should brucellosis be eliminated in those species. The 1998 NAS report states that the chance of transfer of brucellosis from predators and scavengers to bison, elk, or cattle in the Greater Yellowstone Area appears to be extremely small under most conditions, and it would disappear if brucellosis were to be eliminated from elk and bison. The purpose of the management plan is not to eradicate brucellosis from Greater Yellowstone Area wildlife, but to "address the risk of transmission to protect the economic interest and viability of the livestock industry in the state of Montana." The agencies understand that eradication of brucellosis in any wildlife in the Greater Yellowstone Area would likely require a similar effort for the southern Greater Yellowstone Area elk herds. Separate discussions and planning efforts are underway to address the issue of high seropositivity in southern Greater Yellowstone Area elk herds and the risk they present of transmitting brucellosis to cattle. Refer to responses to other comments above for details on this issue.

Representative Comment: 509B, 5436C

B Comment: The Greater Yellowstone Area has the only remaining reservoir of brucellosis in the U.S., and brucellosis should therefore be eradicated so that the country will be free of the disease.

Response: As stated in the responses to other comments above, the purpose of the management plan is not to eradicate brucellosis from Greater Yellowstone Area wildlife, but to "address the risk of transmission to protect the economic interest and viability of the livestock industry in the state of Montana." The agencies understand that the eradication of brucellosis from any wildlife in the Greater Yellowstone Area would likely require a similar effort in at least the southern Greater Yellowstone Area elk herds. Separate discussions and planning efforts are underway to address the issue of high seropositivity in southern Greater Yellowstone Area elk herds and the risk they present of transmitting brucellosis to cattle.

Representative Comment: 8455A

C Comment: The elimination of brucellosis in bison and other wildlife should not be considered or attempted because it would require unethical management methods, and it would constitute a violation of wildness by interfering with natural and evolutionary processes.

Response: The purpose of the management plan is not to eradicate brucellosis from wildlife in the Greater Yellowstone Area, but to "maintain a wild, free-ranging population of bison and address the risk of transmission to protect the economic interest and viability of the livestock industry in the state of Montana." Management actions considered in the alternatives presented are intended to accomplish both of those goals. Two alternatives (alternatives 5 and 6) contain elements that take more extreme measures to remove seropositive animals. During the capture, test, and slaughter phase of these alternatives, bison would not be free-ranging (see volume 1, "Environmental Consequences: Impacts on Bison Population"). All other alternatives are expected to maintain the wild and free-ranging status of the Yellowstone bison population.

Representative Comment: 8626C

Issue 5: ***Transmission of Brucellosis by Other Wildlife***

A Comment: Unless brucellosis is eliminated from bison within Yellowstone National Park, it will spread to other wildlife throughout the Northwest. Some commenters expressed concern about the potential role of wolves in spreading brucellosis northward into Canada.

Response: The agencies agreed that each alternative considered in the environmental impact statement must meet all the objectives set forth for this plan, including defining "a boundary line beyond which bison will not be tolerated," and protecting "livestock from the risk of brucellosis" (volume 1, "Purpose of and Need for Action: Objectives and Constraints"). Alternative actions that address these objectives would also be likely to have the effect of preventing transmission of brucellosis to other species in or around the Greater Yellowstone Area. The 1998 NAS report states that ungulates other than elk and bison, including mule and white-tailed deer, pronghorn antelope, bighorn sheep, and moose, appear not to maintain brucellosis infection and do not appear to present any risk of transmission. Although brucellosis has occasionally been detected in bears, they also appear to be dead-end hosts for the bacteria (NAS 1998). Brucellosis infections have been reported in coyotes elsewhere in the U.S. (Davis et al. 1979), but serologic surveys of coyotes in the park have failed to demonstrate any incidence of brucellosis in the coyote population (Gese et al. 1997). Scientists reviewed the potential role of predators and scavengers, particularly canids, in transmitting brucellosis. They concluded that the "chance of transfer of *Brucella abortus* among elk, bison, and cattle through the activities of predators and scavengers seems extremely small under most conditions (NAS 1998)." Given the tendency of coyotes, wolves, and other carnivores to consume carcasses and other animal material, the panel concluded that "the presence of carnivores in the ecosystem probably reduces the frequency of *B. abortus* moving between bison, elk and cattle" (NAS 1998).

Representative Comment: 8022AA

B Comment: The *Draft Environmental Impact Statement* does not address the potential impact of brucellosis on grizzly bears, black bears, and coyotes and whether these species could transmit brucellosis to cattle or other wildlife.

Response: Until recently, brucellosis was not detected in black bears or grizzly bears in the Greater Yellowstone Area (NAS 1998). Recent data from Greater Yellowstone Area grizzly bears indicate that approximately 20% of the bears tested were positive on serologic tests (K. Aune, Montana Department of Fish, Wildlife, and Parks, unpubl. data). Accompanying culture work has not been done to determine whether these seropositive results indicate presence of the bacteria or infection. No data are currently available as to seroprevalence rates in the grizzly and black bear populations as a whole, whether positive serological tests correlate with infection, and whether infection with *B. abortus* bacteria has any impact on individual bears. Research is underway to address these questions. Although the nature and prevalence of infection in bears in the Greater Yellowstone Area are not known, bears are unlikely to contribute to the persistence of brucellosis in the Greater Yellowstone Area. The fact that bears consume carcasses and other animal materials may act to reduce the frequency of *B. abortus* moving between bison, elk, and cattle (NAS 1998). Brucellosis infections have been reported in coyotes elsewhere in the U.S. (Davis et al. 1979), but serologic surveys of coyotes in Yellowstone National Park have failed to demonstrate any incidence of brucellosis in the coyote population (Gese et al. 1997). During studies in which domestic dogs were experimentally infected with *B. abortus*, they typically did not develop clinical signs of disease, although it is possible for them to do so (NAS 1998). Given this information and the lack of evidence of brucellosis in canids in the Greater Yellowstone Area, it is unlikely that brucellosis has affected coyote or wolf populations. Other Greater Yellowstone Area wildlife appear to be either dead-end hosts or do not maintain *B. abortus* within their populations (NAS 1998).

Representative Comment: 9364DD, 14933A

Issue 6: *Miscellaneous*

A Comment: The U.S. Fish and Wildlife Service and the National Park Service have been negligent in their wildlife management responsibilities by failing to take an active role in eliminating brucellosis in elk and bison under their management jurisdiction.

Response: The U.S. Department of the Interior, which oversees both the U.S. Fish and Wildlife Service and the National Park Service, has recognized that the presence of brucellosis in wildlife is a complex issue. Representatives of both agencies have been working through the GYIBC and by other means to address the issue. The bison management plan, along with planning efforts for the Jackson bison herd and the National Elk Refuge winter range are all commitments being made by the U.S. Department of the Interior to address brucellosis management in the Greater Yellowstone Area. The Department of the Interior is also supporting a variety of research projects that will provide information on the epidemiology of brucellosis in wildlife, assessment of transmission risk, and the development of safe and effective vaccines for bison and elk (refer to volume 1, appendix D for a listing of current and proposed research, and research needs).

Representative Comment: 10638D

B Comment: Why, if brucellosis in elk is a concern, do we allow hunters to leave gut piles containing fetuses in the field?

Response: Because elk in the Montana portion of the Greater Yellowstone Area have a relatively low seropositivity rate (1%–2%), they are not considered to present a significant risk of transmission (NAS 1998). It has been reported that two elk hunters in Montana have contracted brucellosis in the last several decades from handling an infected elk fetus, although this information has not been confirmed (GYIBC, Interspecies Transmission Report). Hunters are therefore advised not to handle fetuses or uterine fluids

and to take appropriate sanitary actions when handling wildlife or animal parts to prevent exposure to a variety of organisms. The actions of predators and scavengers in consuming these materials are likely to reduce the already low risk that gut piles represent.

Representative Comment: 15166B

C Comment: The *Draft Environmental Impact Statement* should include information regarding the fact that Wyoming counties are affected by bison numbers and park policies as well, and the fact that feedlots have caused surveillance testing in Wyoming. Commenters requested information on how the management plan will affect the number of bison exiting to the east of Yellowstone National Park into Wyoming.

Response: Approximately 1%–2% of elk in the northern range herd and between 0.3% and 9.5% of elk in the Madison-Firehole herd (Ferrari 1999), both of which are in or adjacent to the Montana portion of the Greater Yellowstone Area, test positive for exposure to brucellosis. Six of the 104 elk (5.8%) harvested during the 1997 late hunt near Gardiner, Montana, tested positive for exposure to brucellosis, but it is too early to determine what this rate of seropositivity in one limited sample means. Other elk herds using portions of the Greater Yellowstone Area in Montana, including the upper Madison, Gallatin, Gravelly-Snowcrest, and Absaroka herds, have seroprevalence rates of approximately 1%–2%. In contrast to the Montana elk herds, elk associated with the National Elk Refuge and the 22 feedgrounds managed by the state of Wyoming in the southern portion of the Greater Yellowstone Area have seroprevalence rates ranging from 3% to 65% (NAS 1998). Recent evaluation of elk on feedgrounds in the Idaho portion of the Greater Yellowstone Area indicate seroprevalence rates of 32% (B. Hillman, Idaho Department of Agriculture, pers. comm.). These high seroprevalence rates are probably maintained through increased exposure while on the feedgrounds. The purpose of this planning process is to address bison management in Yellowstone National Park and adjacent areas in Montana. Very few bison from Yellowstone National Park travel south into Grand Teton National Park and mingle with the Jackson bison herd; such emigration has been documented only in two recent winters (S. Cain, Grand Teton National Park Wildlife Biologist, pers. comm.). The testing requirements in the six counties of Wyoming were the result of a brucellosis program review conducted in 1997 by APHIS. That review concluded that bison from the park had little or no opportunity to interact with cattle in Wyoming; the review primarily focused on elk, particularly those occurring on the feedgrounds in Wyoming. Separate planning processes exist to address the risk of transmission of brucellosis from southern Greater Yellowstone Area elk and from the Jackson bison herd to cattle.

Representative Comment: 5657B

D Comment: The *Draft Environmental Impact Statement* failed to address elk management inside and outside Yellowstone National Park.

Response: The stated purpose of the environmental impact statement is not to manage elk or brucellosis in elk, but rather to "maintain a wild, free-ranging population of bison and address the risk of transmission to protect the economic interest and viability of the livestock industry in the state of Montana." Management actions considered in the alternatives are intended to accomplish both of those goals. The low seroprevalence rate of the northern Greater Yellowstone Area elk herds (1%–2%), despite occasional seasonal concentrations that result in densities similar to those found on winter feeding grounds, suggests that the risk of transmission from northern Greater Yellowstone Area elk to cattle is lower than that from bison (NAS 1998). Separate discussions and planning efforts are underway to address the issue of high seropositivity in southern Greater Yellowstone Area elk herds and the risk they present of transmitting brucellosis to cattle.

Representative Comment: 14714P

Predators and Scavengers/Ungulates (WI-48)

Issue 1: ***Support or Opposition for Specific Alternatives***

A Comment: Commenters expressed support for alternative 2 because it would result in very little negative impact to other species, and it would make more winter habitat available to other ungulates such as elk, deer, bighorn sheep, and pronghorn.

Response: The purpose of alternative 2 would be to restore conditions for bison to as near natural as possible (DEIS, p. 67). The acquisition or easement of bison winter range outside Yellowstone National Park proposed in this alternative would likely benefit other wildlife species. Closing groomed snowmobile roads as proposed in this alternative, could have beneficial impacts on some wildlife species, by reducing stress associated with disturbance by snowmobile traffic, but it could also have an adverse impact on some species by making travel through deep snow more energetically costly, and by potentially facilitating predation. Closing of groomed roads within the park could also result in some negative impacts to wildlife species on national forest lands if snowmobile traffic increased there (DEIS, pp. 287–288). Refer also to the response to issue 3E below.

Representative Comment: 122J

B Comment: Commenters expressed support for the "Citizens' Plan," because the acquisition of nonpark lands for winter range outlined in the plan would benefit elk and other wildlife and would spare "overload" of winter habitat within the park.

Response: Any alternatives that involve acquisition or easements on bison winter range outside Yellowstone National Park would likely benefit other wildlife species as well, as discussed in the environmental impact statement (see volume 1, "Environmental Consequences: Impacts on Other Wildlife Species") and in this volume, issue 1A above. Portions of the elk population, as well as portions of other ungulate populations currently migrate outside park boundaries in winter in response to harsh winter conditions and increasing snow depths that restrict access to available forage (Houston 1982). Also refer to issues 2D and 4B below.

Representative Comment: 5583B

C Comment: All alternatives presented in the *Draft Environmental Impact Statement* would have adverse impacts on other wildlife species in Yellowstone National Park.

Response: Although all alternatives contain some activities that could cause some disturbance to a variety of wildlife species (e.g., hazing; see DEIS, pp. 282–284), several alternatives are likely to provide a net benefit to some wildlife species. Alternatives 5 and 6 may have adverse impacts on scavenger species by substantially reducing the amount of carrion available in certain areas of the park, and would have a major adverse impact on at least one pair of nesting trumpeter swans and possibly other migrating swans due to the construction and operation of a capture facility in the Seven-Mile Bridge area within the park. This facility would also likely disrupt at least one pair of nesting bald eagles. The operation of up to nine capture facilities and associated activity within the park could also disrupt movement and foraging patterns of a variety of wildlife species in those areas (refer to revised text in volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" and "Impacts on Other Wildlife Species," impacts of alternatives 5 and 6). Access to important winter range for several ungulate species would be improved under alternatives 2, 3, and possibly 7. The modified preferred alternative manages for an overall herd size of 3,000 bison, as well as an increased distribution of bison by allowing bison to occupy public lands beyond the park boundary during the winter months. These factors would likely provide a benefit to predators and scavengers through increased availability of carrion at certain times of the year. Alternatives 1 and 4 are not likely to have an overall net effect on other wildlife species compared with current bison management practices.

Representative Comment: 10459G

Issue 2: ***Impacts on Ecosystem Processes/Maintaining Ecosystem Integrity***

A Comment: The population of bison must be supported at a level that will keep the relationship between predators and prey in the ecosystem as natural as possible.

Response: In all alternatives except 5 and 6 the bison population would be allowed to fluctuate largely in response to environmental factors, with management actions influencing bison numbers only during winters when significant numbers of bison move beyond the areas established for their use as winter range. It is anticipated that under all alternatives except 5 and 6, bison would continue to occupy all areas of the park in which they are currently found, and would therefore continue to die of winterkill or be preyed upon much as they currently are. (Refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts on Bison Population"; also refer to issues 5A–5D below for a discussion of the impacts of alternatives 5 and 6 on predator and scavenger species). Alternative 7 would limit the bison population to approximately 2,500 bison, which could have a minor, long-term negative impact on scavenger populations (DEIS, p. 293; see also volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" for information on wolves and grizzly bears). The modified preferred alternative manages for an overall herd size of 3,000 bison, as well as an increased distribution of bison by allowing bison to occupy public lands beyond the park boundary during the winter months. These factors would likely provide a benefit to predators and scavengers through increased availability of carrion at certain times of year.

Representative Comment: 472E

B Comment: The Greater Yellowstone Area is a unique ecosystem and an increasingly rare natural area, and therefore any conflict between commercial uses and wildlife should be resolved in the interests of wildlife. Commenters also stated that the *Draft Environmental Impact Statement* does not provide an alternative that does not "subordinate" the needs of native wildlife species to livestock.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the lower 48 states (DEIS, p. 137). It is also recognized that a variety of human activities have had impacts on the ecosystem, and that increasing levels of some activities pose threats to various aspects of ecosystem integrity. Many of these activities, however, developed during the period when bison were absent in the vicinity of Yellowstone National Park and in Montana. These issues, however, are beyond the scope of the management plan. As stated in the responses to other comments above, the purposes of the management plan are to "maintain a wild, free-ranging population of bison and address the risk of transmission to protect the economic interest and viability of the livestock industry in the state of Montana." Management actions considered in the alternatives are intended to accomplish both of these goals. The agencies agreed that each alternative must meet the objectives of maintaining a "viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (DEIS, p. 29). It is anticipated that under all alternatives, except 5 and 6, bison would continue to occupy all areas of the park in which they are currently found and would continue to function as an important component of the native ecosystem (refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts to Bison Population"; also refer to the response to issue 4C below).

Representative Comment: 759A

C Comment: The alternatives outlined in the *Draft Environmental Impact Statement* would impact a variety of species, as indicated in the *Draft Environmental Impact Statement* (pp. xxii–xxiv of the "Summary"), and these impacts would have effects throughout the entire ecosystem. Commenters also stated that any management that takes place should be to preserve the "diversity and balance" of the ecosystem.

Response: As stated in the response to issue 2B above, the agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the continental U.S. (DEIS,

p. 137), and that bison are an essential component of that ecosystem "because they contribute to the biological, ecological, cultural, and aesthetic purposes of the park" and therefore of the ecosystem the park inhabits (DEIS, p. 11). The purpose of the management plan is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission" (DEIS, p. 11). Management actions considered in the alternatives are intended to accomplish both of these goals. In order to ensure the persistence of the bison population, the agencies agreed that each alternative must meet the objectives of maintaining a "viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (DEIS, p. 29). It is anticipated that under all alternatives except 5 and 6 bison would continue to occupy all areas of the park in which they are currently found, and they would continue to function as an important component of the native ecosystem (refer to volume 1, "The Alternatives" and "Environmental Consequences: Impacts on Bison Population"). The management of other species or of entire community assemblages is beyond the scope of this planning document. Refer also to responses under "Bison: Ecology" in this volume. The modified preferred alternative provides for an increase in the areas that bison may occupy by allowing them to inhabit areas of public land beyond the park boundary during the winter months.

Representative Comment: 5854G

D Comment: Large numbers of bison in Yellowstone National Park have caused habitat degradation that has had a negative impact on other wildlife populations.

Response: As noted in the *Draft Environmental Impact Statement*, (p. 31), NPS *Management Policies* have a goal of allowing natural processes to regulate the fluctuation in populations of native species to the greatest extent possible (NPS 1998). As noted in the *Draft Environmental Impact Statement* (pp. 21–22), recent studies conducted in the park indicate that grassland habitats within the park exhibit high productivity and species diversity and do not appear to be adversely affected by bison or other ungulate population sizes. A recent study of the effects of the National Park Service's natural regulation policy evaluated the park's northern winter range according to several established criteria for range overuse (Singer et al. 1998). The study found that according to four measures of range health, the northern range has not suffered degradation due to overuse by any ungulates, including bison. Another study (Singer and Norland 1994) found that, during the first 20 years following release of ungulate species from artificial controls, there was no evidence of limitation of any species' population trend due to competition for forage or other habitat needs. During the same time period, grizzly bear numbers and indices of population health also increased (Gunther and Haroldson 1997). Research is underway to better understand the relationship between bison and habitat in the park. Some results are anticipated in mid to late 2001, with additional future work likely. The National Academy of Sciences, National Research Council, consisting of a group of approximately 12 experts from various fields, is currently conducting a review of the science behind ungulate management policy for the northern winter range in the park, and the ecological impacts of ungulates (including elk and bison) on northern range habitats, in order to provide recommendations for implementation by the National Park Service. This review will address questions related to the implications and limitations of natural regulation practices as applied to other biota, current ungulate population dynamics on the northern range, the extent that density-dependent and density-independent factors determine densities and fluctuations in ungulate populations, and the consequences of continuing the current natural regulation practices. Public meetings were held in the Greater Yellowstone Area on January 14 and 15, and July 9, 10, and 11, 1999. A status report was provided to the U.S. Department of the Interior on October 1, 1999. A final report is expected by October 2000. Refer also to response to comment 4B below.

Representative Comment: 16461B

Issue 3: ***Support or Opposition to Specific Alternative Management Actions***

A Comment: Commenters expressed opposition to the provision in alternative 7 for creating a quarantine facility in an area (current or former Royal Teton Ranch land) that is prime winter range and an important movement corridor for bison, elk, bighorn sheep, and antelope. If quarantine facilities are to be used, they

should be constructed at a location that would not impact migration or habitat use by other wildlife species. Also the large amount of traffic and human activity associated with a quarantine facility would cause dis turbance to a wide variety of wildlife species.

Response: It is assumed that the commenter may be referring to the suggestion in alternative 7 that the capture facility currently located at Stephens Creek could be relocated farther north in the area between the park boundary and Yankee Jim Canyon (DEIS, p. 104). The capture facility, used only in winters during which it is necessary to conduct bison management operations of that nature, is different than the proposal in alternative 7 and others to establish a quarantine facility where seronegative bison could be sent prior to being provided to tribes or other public bison herds (refer to "Quarantine" under alternative 7 description). The location of the proposed bison quarantine facility has yet to be determined and therefore was not specified in any alternative. The construction and operation of a quarantine facility on federal lands or using federal money would have to comply with NEPA requirements in a separate environmental assessment or environmental imp act statement process. Potential impacts to wildlife species as a result of the construction, presence, or operation of the quarantine facility would be analyzed and considered at that time. The placement and operation of any bison management facility (capture or quarantine) in the area between the park boundary and Yankee Jim Canyon would have the potential to impact migrating and wintering elk, pronghorn, mule deer, and bighorn sheep, and those impacts would have to be analyzed accordingly.

Representative Comment: 5638C

B Comment: Some commenters expressed opposition to maintaining the capture facility at Stephens Creek because it "severely adversely" impacts the pronghorn population, which is small, recently declining, and at risk of extinction. The facility exists in the core use area for this pronghorn population during winter. It has blocked migration patterns and caused confusion for fleeing pronghorn. Other commenters stated that removal of the Stephens Creek capture facility, which would be made possible through the development of a vaccine and possibly reduction or cessation of road grooming, would relieve the impact that it is currently having on the pronghorn population.

Response: As stated in the DEIS (e.g., p. 286), "Operation of the capture facility at Stephens Creek could potentially contribute to a moderate to major decrease in the pronghorn population," because this population is small, isolated, and has been declining. Observations during the winter of 1996–97, the only winter in which the capture facility has been used, indicated that pronghorn were displaced up to a half-mile away from the area occupied by the facility (Caslick and Caslick 1997). Additional observations indicate that although pronghorn have learned to use the wildlife gates present in the wing fencing, they appear hesitant to do so, traveling along the fence before moving rapidly through the gates. Coyotes are known to have killed two pronghorn in association with the wing and pasture fencing, and an additional two pronghorn mortalities may have also resulted from coyotes chasing pronghorn into or along the fences (NPS, unpubl. data). Two research projects are currently underway to better understand the factors influencing pronghorn population dynamics: one will determine pronghorn fecundity rates and fawn mortality rates and sources, and the other will study pronghorn habitat use and determine whether use patterns are altered by the displacement by humans or other animals. Alternatives in which additional winter range would be acquired north of the park boundary could potentially mitigate for the effects of the capture facility. All alternatives call for vaccination of bison once a safe and effective vaccine is available, but this is not likely to affect use of the capture facility as described in each alternative. Although alternative 2 could involve closing some groomed roads, it is unlikely that this would impact the frequency and magnitude of bison movements on the northern range, since bison use river trails and the plowed road to move toward lower elevation lands during severe winters.

Representative Comment: 14714TT, 15545J

C Comment: The Stephens Creek capture facility should be removed to allow free travel of wildlife through the area.

Response: Some alternatives do include the removal of the Stephens Creek capture facility, either completely (alternative 2), or possibly moving it north of its present location and outside Yellowstone National Park boundary (alternatives 3 and 7), if the agencies have acquired access for bison to those lands via easement or purchase from willing sellers. It is unlikely that the capture facility has any significant impact on the movements or habits of wildlife species in the area other than pronghorn.

Representative Comment: 2117C

D Comment: Plowing some park roads as outlined in some alternatives would result in the killing of many park animals due to by vehicle collisions.

Response: The agencies do not anticipate that roads plowed to provide access to capture facilities, as described in alternatives 5 and 6, would be open to any traffic other than administrative traffic associated with operation of the facilities and other park operations. The limited nature of this travel would be unlikely to increase the number of vehicle/wildlife collisions as compared to current winter recreational use. If, however, any of the plowed roads were opened to wheeled vehicle traffic as part of other park management decisions (e.g., as a result of the *Draft Winter Use Plan Environmental Impact Statement*, NPS 1999a), it may be expected that vehicle-related wildlife mortality would increase (Gunther et al. 1999). The actual number of collisions, however, would likely be small, and in most cases would represent less than 1% of the total population (Gunther et al. 1999). Mitigating measures could include restrictions on vehicle speed and the time of day that roads would be open. Refer to response to issue 3E below for additional information regarding the impacts of plowed and groomed roads on wildlife.

Representative Comment: 8652E

E Comment: Commenters expressed opposition to a reduction or cessation of grooming for snowmobiles, stating that groomed roads provide energy-efficient travel routes for many animals during winter, allowing them easier escape from predators. Other commenters stated that wildlife do not appear to be affected by the passing of snowmobiles.

Response: Several studies have reported impacts of snowmobile activity on wildlife. Generally elk (Bury 1978) and other wildlife may be displaced by snowmobile activity, although disturbance and displacement tend to occur less often when snowmobile or other activity occurs on a predictable schedule and in a defined area such as a road (Ward 1973, Aune 1981). In a study in Yellowstone National Park, Aune (1981) found that various wildlife species were more likely to be displaced or exhibit a flight response during times when snowmobile traffic occurred at irregular or unpredictable intervals, which generally occurred early in the winter. Decreased response later in winter, however, may have been due all or in part to the animals' decreasing nutritional condition. Fleeing even over short distances in deep snow requires increased energy expenditure, which may lead to a negative energy balance, causing adverse effects on an animal's ability to survive, give birth, and raise offspring (Gabrielsen and Smith 1995). Responses to loud noise, even in the absence of fleeing behavior, may include increased heartbeat (Ward and Cupal 1979) and increased production of stress-related hormones (Garrott and Creel 1998). Prolonged hormonal stress response may adversely affect reproduction, immune response, growth, and metabolic efficiency (Garrott and Creel 1998). Although wildlife have been observed to use groomed snowmobile roads and it is assumed this provides energy-efficient travel, it is not clear whether those energy savings outweigh the costs of repeated disturbance or displacement by snowmobile traffic. Studies currently being conducted on bison use of groomed roads indicate that bison tend to use waterways and off-road trails that they maintain for much of their travel on the west side of the park (Bjornlie and Garrott 1998). Research is underway to explore the impacts of winter recreation in the park on a variety of wildlife species (Garrott and Creel 1998). Refer to the response to issue 3D above.

Representative Comment: 15431C

Issue 4: ***Additional Information or Analysis/Miscellaneous***

A Comment: Carrying capacities should be established within Yellowstone National Park for all wildlife, so that wildlife do not leave the park and do not die of starvation or cause habitat degradation.

Response: The policies of the National Park Service, and Yellowstone National Park in particular, direct that all wildlife populations within the park boundary be managed by natural processes, unregulated by human removals within the park to the maximum extent possible (NPS 1988). Due to elevation and consequent snow accumulation, the park provides summer habitat for many species, but winter range for some species is limited within the park during most winters. Many species, particularly ungulates such as bison, elk, mule deer, and pronghorn, have throughout history used higher elevation areas inside the park boundary as summer range and have migrated to lower elevation areas such as the Yellowstone River valley during the winter. These migrations are natural events and are critical to the survival of the populations that do so. Additionally, some migratory wildlife are hunted outside the park boundary, providing an important recreational opportunity to many people. As noted in the DEIS (pp. 21–22), recent studies conducted in the park indicate that grassland habitats within the park exhibit high productivity and species diversity and do not appear to be adversely affected by ungulate population size. A recent study of the effects of the NPS natural regulation policy evaluated the park's northern winter range according to several established criteria for range overuse (Singer et al. 1998). The study found that, according to four measures of range health, the northern range has not suffered degradation due to ungulate overuse. Overwinter mortality, or winterkill, results from the combined effects of increased energy needs and decreased energy intake, both of which are due to decreased temperatures, increased snow depth, and decreased forage quality caused by seasonal nutrient changes in plant species. Winterkill is a natural process and will continue to be an important source of mortality for many wildlife species within the park. The National Academy of Sciences (NAS), National Research Council, a group of approximately 12 experts from various fields, is currently conducting a review of the science behind ungulate management policy for the northern winter range in the park, and the ecological impacts of ungulates (including elk and bison) on northern range habitats, in order to provide recommendations for implementation by the National Park Service. The NAS review will address questions related to the implications and limitations of natural regulation practices as applied to other biota, current ungulate population dynamics on the northern range, the extent that density-dependent and density-independent factors determine densities and fluctuations in ungulate populations, and the consequences of continuing the current natural regulation practices. A final report is expected to be completed by early 2001. Refer also to responses in this volume under "Bison: Ecology," particularly issue 3C and 2D above.

Representative Comment: 2740E

B Comment: The impacts that livestock grazing in the Greater Yellowstone Area has had on wildlife populations, in terms of reduction in numbers, habitat degradation, loss of genetic diversity, and changes in population dynamics, should be thoroughly documented in the *Draft Environmental Impact Statement* as cumulative impacts of the larger action of allowing livestock grazing on public lands in the Greater Yellowstone Area.

Response: The agencies recognize that the Greater Yellowstone Area is one of the "largest and most nearly intact" ecosystems in the continental U.S. (DEIS, p. 137). It is also recognized that various human activities have had impacts on the ecosystem, and that increasing levels of some activities pose threats to various aspects of ecosystem integrity. These issues, however, are beyond the scope of the management plan. Impacts of livestock grazing are addressed in separate planning documents, such as the Gallatin National Forest *Management Plan*, for public lands on which livestock are grazed. Refer also to response to issue 2B above.

Representative Comment: 9369N

C Comment: The *Draft Environmental Impact Statement* does not provide adequate information about the environmental consequences of removing large numbers of bison, as in alternative 5, in terms of their role

in maintaining habitat structure and in their relationships with other species such as prairie dogs and pronghorn.

Response: As noted in the *Draft Environmental Impact Statement* (p. 215), it is likely that several areas in Yellowstone National Park would have few to no bison for some years following the capture, test, and slaughter phase outlined in alternative 5. The document also notes that the ecological consequences of such removals would be difficult to assess (DEIS, p. 290). Some minor, localized habitat changes could occur, such as growing in of wallows, but it is likely that the actions of other grazing and browsing animals, as well as fire and climatic events, would maintain open areas and grassland productivity. Prairie dogs do not currently exist in the park, and a search of the park's records back to 1886 did not reveal any prairie dog sightings within the area considered in this planning document (Yellowstone National Park Bear Management Office, pers. comm.). The relationship between bison and pronghorn in this area has not been established, but it is likely that the pronghorn population is influenced primarily by the combined effects of predation, habitat and climate characteristics, and human activity and development on winter range rather than by bison numbers. Refer also to responses under "Bison: Ecology."

Representative Comment: 14714TT

D Comment: The *Draft Environmental Impact Statement* failed to include information about the role of predators and scavengers in removing potentially infectious birth materials, and therefore in reducing overall risk of transmission. Commenters referred to pages 51 and 56 in the 1998 NAS report in support of their comments.

Response: Although brucellosis has occasionally been detected in bears, they appear to be dead-end hosts for the bacteria (NAS 1998). Brucellosis infections have been reported in coyotes elsewhere in the U.S. (Davis et al. 1979), but serologic surveys of coyotes in Yellowstone National Park have failed to demonstrate any incidence of brucellosis in the coyote population (Gese et al. 1997). Scientists reviewed (NAS 1998) the potential role of predators and scavengers, particularly canids, in transmitting brucellosis (NAS 1998). They concluded that the "chance of transfer of *B. abortus* among elk, bison, and cattle through the activities of predators and scavengers seems extremely small under most conditions." Given the tendency of coyotes, wolves, and other carnivores to consume carcasses and other animal material, the panel concluded that "the presence of carnivores in the ecosystem probably reduces the frequency of *B. abortus* moving between bison, elk and cattle" (NAS 1998). Refer also to responses to comments in this volume under "Wildlife: Brucellosis in Other Wildlife."

Representative Comment: 14819Z

E Comment: The *Draft Environmental Impact Statement* did not contain any analysis to demonstrate that pronghorn numbers would be maintained or increased if the Stephens Creek capture facility remains in operation, failed to provide analysis of impacts of the facility since 1996–97, and failed to propose a program to monitor possible impacts of the facility. The DEIS did not provide adequate information about the declining mule deer population and the potential impacts on this population of proposed management actions.

Response: Refer to response to comment 3B, above. Observations during the winter of 1996–97, the only winter in which the Stephens Creek capture facility has been used, indicated that pronghorn were displaced up to a half-mile away from the area occupied by the facility (Caslick and Caslick 1997). Coyotes are known to have killed two pronghorn in association with the wing and pasture fencing, and an additional two pronghorn mortalities may have also resulted from coyotes chasing pronghorn into or along the fences (NPS, unpubl. data). As noted in the *Draft Environmental Impact Statement* (p. 283), "Because of the small size and vulnerability of this population, the loss of a few individuals could have moderate to major impacts on the population as a whole." Prior to construction of the capture facility, this population was estimated to have an approximately 18% chance of going extinct within the next 100 years, a level generally considered unacceptable in the conservation biology literature (Goodman 1996). The presence and operation of the capture facility in combination with other pressures on the pronghorn population

(e.g., predation, climate, limited available winter range) could cause the population, which has decreased in numbers in recent years, to decline further. Two research projects are currently underway to better understand the factors influencing pronghorn population dynamics: one will determine pronghorn fecundity rates and fawn mortality rates and sources, and the other will study pronghorn habitat use and determine whether use patterns are altered by displacement by humans or other animals. In the Gardiner Valley and northern portion of Yellowstone National Park mule deer numbers through 1996 had not declined as had many other mule deer populations in the region, although the harsh winter of 1996–97 apparently depressed population numbers and recruitment for one to two years (T. Lemke, Montana Department of Fish, Wildlife and Parks, unpubl. data). Counts from 1998–99 show increased survivorship and recruitment, indicating population recovery from that climatic event (T. Lemke, Montana Department of Fish, Wildlife and Parks, unpubl. data). It appears that climatic factors and natural mortality are the major influences on the mule deer population in this area (T. Lemke, Montana Department of Fish, Wildlife and Parks, unpubl. data). Mule deer do not appear to have made significant use of the area near the Stephens Creek capture facility for at least 10 years prior to its construction or in the three years since (P. Gogan, U.S. Geological Survey BRD, pers. comm.; MDFWP, unpubl. data). Therefore, it is unlikely that the continued presence or operation of the facility would impact the mu le deer population. Alternatives under which additional winter range would be acquired north of the park boundary could potentially mitigate for the effects of the capture facility on pronghorn and could benefit mule deer by providing additional winter range.

Representative Comment: 15420VI

F Comment: The impacts on pronghorn are greater (than presented in the environmental impact statement) due to the proposed management activities in Reese Creek.

Response: Potential impacts on pronghorn were disclosed and then in more specific detail in the DEIS (pp. 282–284). Additional impact information was provided on an alternative-by-alternative basis on pp. 284–294. The pronghorn herd in the park migrates in the spring up to the area around the confluence of the Lamar River and Soda Butte Creek. This migration is usually after the bison move back into the area because bison are more snow-tolerant than pronghorns. In the fall, the pronghorns usually migrate back down to the Stephens Creek area prior to heavy snowfall (approximately December 1). As stated in the *Draft Environmental Impact Statement*, pronghorns are typically displaced approximately a half-mile away from the capture facility when people are operating the facility. The *Draft Environmental Impact Statement* also disclosed that coyotes have killed pronghorns in the area of the Stephens Creek capture facility, perhaps aided in their hunt by the presence of the wing fences in previously open areas. No other potential effects on pronghorn are anticipated.

Representative Comment: 14980T

G Comment: There is evidence that a number of species, including pronghorn, evolved in complementary relationships to the bison and that the virtual elimination of the bison from the west has significantly impacted pronghorn.

Response: The comment may well be correct. Any symbiotic relationship between bison and pronghorn has likely undergone considerable changes over the years as the bison herds dwindled. It may even be the case that such a relationship no longer exists between the Yellowstone bison herd and the pronghorn that occupy the park. Analyzing this possible relationship was considered beyond the scope of the environmental impact statement. Refer also to responses in this volume under "Bison: Ecology."

Representative Comment: 9369I

Issue 5: ***Availability of Meat/Carrion for Predators and Scavengers***

A Comment: Winter road grooming should be reduced or halted so that bison die of winterkill and thereby provide a source of carrion for predators and scavengers within Yellowstone National Park.

Response: In alternative 2, certain road segments would remain ungroomed or remain closed to winter traffic. It is unclear to what extent bison use groomed roads to exit the park. It appears that bison tend to use waterways and off-road trails that they maintain for much of their travel on the west side of the park (Bjornlie and Garrott 1998), and that much of their movement toward park boundaries may occur on such routes. Groomed roads may have contributed, however, to the redistribution of bison westward within the park earlier in the winter than prior to road grooming, and this may predispose some bison to exit the park (Meagher 1997). Bison are highly social and appear to retain and pass along knowledge through generations (Meagher 1985), so it is possible that closing groomed roads may not impact bison movements, distribution, and population size. The bison population is predicted to increase under alternative 2 (see volume 1, "Environmental Consequences: Impacts on Bison Population — Impacts of Alternative 2"), which could result in more carrion available to scavengers within the park. The deterministic model predicting the population increase, however, was not capable of considering potential changes in movements and distribution resulting from cessation of road grooming. Therefore, the impacts of closing roads or ceasing grooming on the bison population and consequently on the availability of winterkill are not possible to predict with certainty. Research is currently being conducted to better understand the relationship between road grooming and bison movement and distribution patterns (see volume 1, appendix D, for a list of current and proposed research projects).

Representative Comment: 924AI

B Comment: If bison populations are to be reduced as stated in the preferred alternative, care should be taken to ensure that carcasses are left for scavengers to use during the winter and spring. Some commenters stated that a varying number of bison should be killed periodically during the winter to control bison numbers, but that carcasses should be transported to areas within the park for use by scavengers. Others stated that the gut piles from hunting bison within the park and in the SMAs would provide food for scavenger species.

Response: The policies of the National Park Service, and of Yellowstone National Park in particular, direct that wildlife populations within the park boundary be managed by natural processes, unregulated by human removals within the park to the maximum extent possible (NPS 1988). In keeping with these policy directives, none of the alternatives calls for culling bison inside park boundaries specifically for the purpose of controlling population size or providing scavengers with food. Some alternatives would result in the shooting in the park of some bison that could not be captured; in those cases the carcasses would be retained within the park for consumption by scavengers, with the exception of a few that might be removed for research, educational, or cultural purposes. Transporting bison carcasses to remote areas, however, would require extremely expensive and logistically difficult means. Due to the fact that management actions outside the park would likely occur in areas necessarily accessible to humans, leaving carcasses or gut piles at management sites could increase the likelihood of negative encounters between humans and bears or other wildlife. Hunting is not proposed inside the park under any alternative. If hunting occurred outside the park, it is likely that in most cases gut piles would be left in the field for scavengers to consume. Measures requiring the removal of viscera near areas of human habitation or use could be required to reduce potential conflict between humans and scavenger species.

Representative Comment: 5838B, 12042C

C Comment: The alternatives that result in decreased numbers and distribution of bison would have a negative impact on wolverines and other predator/scavenger species. If too many bison are killed as a result of management actions or to control population numbers, predators such as wolves and grizzly bears will begin to prey on livestock, which will ultimately result in their removal, as well.

Response: It is anticipated that under all alternatives except 5 and 6 bison would continue to occupy all areas of the park where they are currently found, and they would continue to provide a food resource to grizzly bears and other wildlife. As stated in the analysis for alternative 5 in the *Draft Environmental Impact Statement* ("Environmental Consequences: Impacts on Other Wildlife — Predators and Scavengers"), removal of a significant portion of the bison population (as described in alternatives 5 and

6) would likely have "a moderate adverse effect on scavenger species." The species most likely to be affected by a reduction in the availability of bison as carrion is the grizzly bear. Although grizzly bears rely on a variety of foods, a large reduction in the number of winterkilled bison carcasses in combination with the low availability of other natural foods could contribute to increased bear/human conflicts. Currently, predation by wolves appears to be a very minor source of mortality for bison (Smith et al. 1999). Wolves in the Pelican Valley area in the interior of the park may rely more heavily on bison as prey than those in the northern range and the Madison-Firehole area, where elk are more available and/or represent easier prey for wolves than bison (Smith et al. 1999). It is possible that a severe reduction of bison in the Pelican Valley area could have a negative effect on the wolves in that area, but it is unlikely that such an impact would cause wolves to begin preying on livestock outside the park boundary. In general, wolf movements and activity outside the park boundary are not expected to be influenced by bison numbers. Yellowstone Center for Resources staff have monitored and will continue to monitor wolf predation on bison (Smith et al. 1999) in the park. Several agencies, including the National Park Service, U.S. Fish and Wildlife Service, APHIS, and state agencies, have been cooperating and will continue to cooperate in monitoring and managing wolf presence in areas inhabited by livestock. Wolverines have only rarely been recorded in the Greater Yellowstone Area (YNP Bear Management Office, pers. comm.). Bison are not thought to be a major food source for wolverines (see DEIS, p. 179), and therefore it is unlikely that a reduction in bison numbers would impact the wolverine population. Refer also to volume 1, "Environmental Consequences: Impacts on Threatened, Endangered and Sensitive Species."

Representative Comment: 13294C

D Comment: Severe reduction or removal of the bison population would cause increased predation pressure on other species, such as deer or pronghorn.

Response: Refer to issue 5C above. Wolves in the Pelican Valley area in the interior of Yellowstone National Park may rely more heavily on bison as prey than those in the northern range and the Madison-Firehole area, where elk are more available and/or represent easier prey for wolves than bison (Smith et al. 1999). If bison numbers were severely reduced in the Pelican Valley area, wolves there could turn to alternate prey, such as elk or small mammals, or could move to other areas of the park in search of prey. Removing of a significant portion of the bison population, as described in alternatives 5 and 6, would be unlikely to affect wolf predation habits in the northern range and Madison-Firehole areas of the park due to the availability of elk in those areas. Pronghorn and mule deer do not appear to be a major prey item for wolves, representing only 3% each of the total wolf kills recorded in 1998 (Smith et al. 1999). This is likely to remain the case regardless of changes in bison population size, largely because of the abundance and availability of elk, and in part because neither pronghorn nor mule deer are abundant in areas inhabited by wolves. Although grizzly bears and coyotes are known to prey occasionally on some ungulate species, their use of bison is confined almost exclusively to feeding on carrion resulting from winterkill. It is unlikely that reductions in the bison population would influence these species' tendency or ability to kill other ungulate species.

Representative Comment: 15213BC

E Comment: The *Draft Environmental Impact Statement* failed to provide information about the impacts to predator and scavenger species of not allowing bison to move outside Yellowstone National Park boundaries and die there, as they did historically, or of removing those bison that do move outside park boundaries.

Response: In developing the purpose and need for action, the agencies recognized that "bison are an essential component of Yellowstone National Park and the Gallatin National Forest," and that "Yellowstone National Park is not a self-contained ecosystem for bison, and periodic migrations into Montana are natural events" (DEIS, p. 11). In agreeing on these statements, the agencies have recognized that it is appropriate for bison, under specific conditions outlined in the final bison management plan, to use some lands outside the park boundary. All alternatives except alternative 5 allow some bison movements outside the park boundary, resulting in the possibility of bison dying of winterkill there.

Unfortunately, detailed information on historic bison use of those lands or on their impacts on other wildlife species is not available. Bison were extirpated from lands outside the park boundary by the late 1800s, and other wildlife species, such as bears and wolves, which may have used bison or bison carcasses, were also extirpated or drastically reduced both within the park and in the areas surrounding the park shortly thereafter.

Representative Comment: 15329K

Threatened and Endangered Species (WI-49)

Issue 1: ***Threatened and Endangered Species Dependence on Bison Carrion***

A Comment: Removal of bison from the park would adversely affect populations of threatened and endangered species that rely on carrion in critical feeding times.

Response: A stochastic model, described in the "Environmental Consequences" part of this final environmental impact statement, was used to predict bison population numbers, assuming the influence of stochastic events and management actions prescribed by each alternative. The resulting bison population numbers were one of several factors used to determine the impacts on those threatened and endangered species, particularly grizzly bear, that rely on carrion in various seasons. In all alternatives, except 5 and 6, bison would continue to occupy all areas of the park in which they are currently found, and they would continue to die of winter conditions or be preyed upon much as they are currently. Bison population levels in alternatives 2 and 3 would increase and would result in minor-to-moderate beneficial impacts on grizzly bears and wolves because of the increased availability of bison carcasses. Alternatives 4, 6, and 7 would result in bison populations that would be similar to alternative 1. Even though the population could be slightly smaller, the effect on availability of carcasses would be negligible. Only alternative 5 would have moderate to major adverse impacts on grizzly bears and wolves due to a reduced bison population. The modified preferred alternative would result in additional bison carrion that could provide a slight beneficial impact to grizzly bear and nonexistent-to-negligible adverse impact on gray wolves (see volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" for additional detail). In addition, as part of the consultation process with the U. S. Fish and Wildlife Service, a biological assessment was prepared to determine the effects of the modified preferred alternative on threatened and endangered species and those proposed for federal listing. Specific impacts on particular threatened or endangered species are discussed under issues within this section.

Representative Comment: 15294 F

Issue 2: ***Bison and Elk Carrying Capacity Relative to Threatened and Endangered Species***

A Comment: Analyze the effects on threatened and endangered species in order to determine carrying capacity of bison and elk populations in Yellowstone National Park.

Response: Effects on threatened and endangered species are analyzed for all alternatives in volume 1, "Environmental Consequences: Impacts on Threatened, Endangered and Sensitive Species." Some disturbance and displacement of threatened and endangered species could occur, but these effects would be generally short-term and negligible in all alternatives, except in alternatives 5 and 6 where grizzly bears and wolves would be adversely impacted by reduced carrion availability, and where bald eagles would be impacted by capture facilities. Negligible impacts result because some of the threatened and endangered species are very scarce and also because the area of disturbance and displacement for some species is very small relative to the total amount of suitable habitat available to that of threatened and endangered wildlife. Because impacts on threatened and endangered species have been determined to be minor or negligible for most alternatives, such impacts have been a minor element in determining a desirable bison herd size.

Although a specific ecological carrying capacity for bison or elk in the park has not been established, a population model developed by Boyce (1990) indicated that Yellowstone will support a long-term average of approximately 2,700 bison. However, weather and forage production are quite variable, and correspondingly, the maximum herd size fluctuates between 1,700 and 3,500 (Boyce 1990; Boyce and Gaillard 1992). For alternatives 1 through 4, the bison population is expected to fluctuate between 1,700 and 3,500 animals, influenced largely by environmental factors and to varying degrees by the management activities specified under each alternative. The modified preferred alternative would manage the herd size at 3,000. A population size of approximately 3,000 was identified as a "rule of thumb" in the

1998 NAS report, above which the frequency and size of bison movements to areas outside the park would increase.

Representative Comment: 2029C

Issue 3: ***Relationship of Bison Carrying Capacity to Grizzly Bears and Wolves***

A Comment: What is the relation between bison carrying capacity and predators like grizzly bears and wolves? Is the 1,700 number in the environmental impact statement feasible given the needs of grizzly bears and wolves?

Response: It is well established that a relationship exists between bison and predator populations, but the relationship cannot be quantified**.** Although 1,700 is identified in table 10 of the *Draft Environmental Impact Statement* as the lower end of the bison population range for several alternatives, none of the alternatives except alternative 5 is expected to result in a reduction of the population to below 1,700 animals although some short-term reductions could be associated with extreme stochastic events. The number 1,700 is considered less preferable, not because of the potential effect it might have on predators, but because of the high number of bison that would have to be removed from the park to maintain that population. Where major reductions in the bison population do occur, such as in alternative 5, impacts on grizzly bears and wolves are moderate to major and adverse. For more detailed information on how the bison population might affect the grizzly bear and the wolf, see response under issue 1 above and issue 18 below.

Representative Comment: 15742J

Issue 4: ***Impacts on Threatened and Endangered Species Outside the Park***

A Comment: The *Draft Environmental Impact Statement* failed to address the impacts of bison removal outside Yellowstone National Park and its effects on wildlife. It failed to address the impacts on grizzly bears, wolverines, and wolves outside the park.

Response: Potential effects from bison removals on threatened and endangered species outside the park were discussed in relation to the SMAs and the various boundaries outside the park where bison would be allowed. The *Draft Environmental Impact Statement* used a definition of the analysis area as "that portion of the Greater Yellowstone Area (Greater Yellowstone Area) habitually occupied by bison," and this includes areas outside the park. These are the only areas where bison would be removed by management actions addressed in the *Bison Management Plan*. Many of the management actions discussed would take place outside the park in the identified SMAs of alternatives 1 through 7 or in zones described in the modified preferred alternative. The only other bison removals discussed involved shooting bison at various locations to enforce boundaries defined by the various alternatives. No other bison removal actions are within the mandate of the cooperating agencies that prepared the *Draft Environmental Impact Statement*, and no other bison removals by any other agencies have been planned or proposed.

Potential effects on grizzly bear, wolverine, and wolf were disclosed in the DEIS, table 12 and in "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species." These effects were considered negligible except in alternative 5, where moderate to major adverse effects would occur to grizzly bears and gray wolves because of a rapid reduction in bison population numbers. In the modified preferred alternative, impacts on grizzly bears would be negligible, but for gray wolves negligible-to-minor benefits could occur due to tolerance of bison beyond park boundaries during winter months.

Representative Comment: 15329K

Issue 5: ***Effects of Winter Trails and Snowmobiles on Wolverine and Lynx***

A Comment: Eliminate winter grooming of roads and trails, and snowmobiles, in Yellowstone National Park if it impacts threatened and endangered species. Wolverine and lynx should have measures in place to protect them from winter road grooming and snowmobiling, particularly in Gallatin National Forest.

Response: Alternative 2 is the only alternative that proposes the long-term elimination of winter grooming and snowmobile use of some trails. The analysis of alternative 2 indicates that changes in road grooming could cause a shift in snowmobiling onto national forest lands, and that packed snowmobile routes might allow competitors of the lynx better access into lynx habitat. This was considered an indirect, effect on lynx, but the magnitude was considered negligible. Negligible impacts on lynx and wolverine were also anticipated for all other alternatives (see volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species — Impacts Common to All Alternatives [Sensitive Wildlife Species]"). A similar finding was identified for the lynx in the analysis of the modified preferred alternative — the alternative may affect, but is not likely to adversely affect, the lynx (see *Biological Assessment* [USFWS 2000] for the "Interagency Bison Management Plan").

The wolverine and lynx are considered rare and scarce in the Greater Yellowstone Area. Both species are solitary animals and have large feet with dense, stiff hair around the pads, enabling effective travel in deep snow. Both species prefer wooded areas or areas with good cover for hunting. Conifer forests and areas with dense vegetative cover are not preferred areas for snowmobiling. Snowmobiling also occurs during winter when wolverines are in dens at high elevations. Because snowmobiles typically operate during the daytime and, are restricted in the park to specified groomed roads and trails, any further park restrictions would offer little if any protection for wolverine and lynx. If den sites were known, they could be protected with area closures, but because these animals are rare and scarce, their den sites are rarely located. Mitigation measures that could be implemented in Gallatin National Forest are identified in responses below.

Representative Comment: 16558H, 11055F

B Comment: Alternatives 2, 5, and 6 identify potential adverse impacts on lynx and wolverine as a result of snowmobile recreation being displaced from Yellowstone National Park to Gallatin National Forest lands. The *Draft Environmental Impact Statement* fails to identify available mitigation measures that can be implemented to reduce or eliminate these potential adverse impacts.

Response: As noted in issue 5A, negligible effects on lynx and wolverine would be anticipated under alternative 2, although snowmobile use that would have occurred in the park could shift to Gallatin National Forest in the West Yellowstone area (see DEIS, p. 272 for more specific discussion). The comment letter correctly points out that mitigation measures are available to the U.S. Forest Service in Gallatin National Forest, including area closures within the national forest for snowmobile use, and restricting snowmobiles to groomed trails. The impact analysis in the *Draft Environmental Impact Statement* and in the *Biological Assessment* (USFWS 2000) both concluded that potential impacts to the lynx would be minor to negligible; therefore, additional mitigation measures were not proposed. If alternative 2, 5, or 6 was selected for implementation, and if monitoring of snowmobile use in the national forest showed significant snowmobile increases in known lynx or wolverine habitat (but because of the rarity and scarcity of both species, knowledge of their occupied habitat is meager), then the Gallatin National Forest would likely impose such restrictions.

Representative Comment: 14714RR

Issue 6: ***Lynx***

A Comment: The alternatives could negatively impact lynx.

Response: Changes in bison populations or management operations in all alternatives would have only negligible effects on lynx (see DEIS, p. 268). A biological assessment prepared for the modified preferred alternative concludes that the lynx is not likely to be adversely affected for the following reasons: the secretive nature of the lynx; the bison capture facility sites are located in low-quality habitat for lynx; hunting and denning habitat for lynx would not be affected, nor would the habitat of the snowshoe hare, the primary prey of lynx; and the RB51 vaccine for bison is preliminarily considered safe for lynx. Also see the response to comments under issue 5 above for additional information on lynx.

Representative Comments: 1006J

Issue 7: ***Wolverine***

A Comment: Assess the impacts of operating capture quarantine facilities and other management actions on wolverine habitat. The alternatives could negatively affect wolverine.

Response: Wolverine primarily inhabit coniferous forest zones at higher altitudes during the summer and mid-to-lower elevations during the winter. The capture facilities are located at lower elevations than those inhabited by wolverine and are in areas of grassland or shrub/steppe vegetation communities that wolverine would very rarely use for hunting. For these reasons, the capture facilities would not cause the removal of any available wolverine habitat. Wolverine may opportunistically scavenge bison carcasses, but this is a very small part of the wolverine diet. The alternatives (alternative 5 and possibly 6) that would reduce the bison population and thereby reduce the number of carcasses, would have a negligible effect on the wolverine food supply. The impacts on wolverines as a result of bison management under all alternatives are expected to be negligible. See responses in this volume under "Wildlife: Predators and Scavengers/Ungulates — Issue 1" for additional impact information.

Representative Comments: 15671N, 1006J

Issue 8: ***Incomplete DEIS Analysis***

A Comment: Why are the anticipated impacts on certain species being dismissed?

Response: The determination of which species to analyze was part of the process of scoping at the initiation of the project. The National Environmental Policy Act mandates that whenever an environmental impact statement is to be prepared, a list of potentially affected threatened and endangered species must be requested from the U.S. Fish and Wildlife Service. That procedure determines which threatened and endangered species would be analyzed in the impact statement. Yellowstone National Park, Gallatin National Forest, and the state of Montana also provided their respective lists of important, protected, or sensitive species that were to be analyzed. These lists did not, of course, contain all species present in the Greater Yellowstone Area. The lists contained numerous species that would be considered representative and indicative of environmental conditions. Other species were not dismissed but were considered less important and thus were not carried through analysis.

Representative Comment: 15874aY

Issue 9: ***Cumulative Impacts on Threatened and Endangered Species***

A Comment: What are the cumulative impacts on threatened and endangered species (including the black-tailed prairie dogs)? The cumulative effects of the current grazing program and reduced bison herd, food for wolves, are not examined together.

Response: Cumulative impacts on threatened and endangered species that are common to all alternatives are presented in the *Draft Environmental Impact Statement* on p. 268. Specific impacts on threatened and endangered species are presented on an alternative-by-alternative basis on pp. 269–281. There are no black-tailed prairie dogs in Yellowstone National Park. There is potential habitat for the prairie dogs east

and south of the park on lower-elevation grasslands. There is no formal grazing program in the park. Under the parks' natural regulation policy, all park herbivores (bison, mule deer, white-tailed deer, pronghorn antelope, bighorn sheep, and elk) are free to graze where they wish. Elk comprise the major portion of the wolf diet, and wolves tend to follow the elk herds. Wolves also concentrate around elk calving grounds in the spring. Only two park wolf packs have demonstrated the ability to take bison calves, yearlings, or adult bison. Because ungulates are creatures of habit to some degree, they tend to graze in the same areas from year to year, and their winterkill carcasses tend to occur in similar areas each year. Predators tend to learn these patterns, and bear and wolves especially seek winterkill carcasses in known areas in the spring. A reduced bison herd would provide a slightly reduced prey base and carrion base for predators and scavengers, but the effect on bears, wolves, and other scavengers is considered negligible except under alternative 5. Alternatives 1, 2, 3, and the modified preferred alternative would be expected to maintain the bison population at or above a size that would provide sufficient carrion for local grizzly bear populations. Alternatives 4, 6, and 7 would have slightly smaller bison populations than alternative 1, but the net effect on wildlife species would be the same as under alternative 1 or current bison management practices.

Representative Comment: 13464Y

Issue 10: ***Black-Footed Ferret and Black-Tailed Prairie Dogs***

A Comment: Address the impacts on black-footed ferret and black-tailed prairie dog.

Response: The U.S. Fish and Wildlife Service did not request that the National Park Service, the U.S. Forest Service, and the state of Montana analyze the potential impacts on black-footed ferret for the bison management plan. Neither black-footed ferret nor black-tailed prairie dogs are known to occur in the area considered in the bison management plan. Because prairie dog towns are not present in the area, no impacts to black-footed ferret or prairie dogs are expected. Black-tailed prairie dogs had a historic range in the central prairies of the U.S. that extended to the east of Yellowstone National Park. There is potential habitat east and south of the park on lower elevation grasslands.

Representative Comment: 13464BB

Issue 11: ***Plants***

A Comment: The *Draft Environmental Impact Statement* lacks the analysis to comply with NPS policy regarding species of concern. It failed to address the impacts of the alternatives on the habitat of plants listed or being considered for listing by U.S. Fish and Wildlife Service.

Response: Sensitive plant species were addressed in the *Draft Environmental Impact Statement* in "Affected Environment" (p. 179) and "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" (pp. 267–268). No impacts are anticipated from management operations or from changes in the bison population. Where new capture facilities (alternatives 3 [phase 2], 5, 6, and 7 [phase 2]) or quarantine facilities (alternatives 3, 4, 7, and the modified preferred alternative) might be constructed, the facility would be located according to siting criteria identified in the *Draft Environmental Impact Statement* (p. 56). Appropriate NEPA analysis would also be conducted, including threatened, endangered, and sensitive plant surveys, in order to identify any potential impacts. If listed species would be affected, the proposed facility would be redesigned, relocated, or other mitigations undertaken. The existing facilities (capture facilities and access roads) had their own specific environmental analyses conducted prior to their construction. The U.S. Forest Service Forest Service prepared an environmental assessment and a biological evaluation prior to construction of the Horse Butte capture facility in Gallatin National Forest. The National Park Service prepared an environmental assessment prior to the construction of the Stephens Creek capture facility. Those two environmental documents concluded that no threatened, endangered, or sensitive plant species would be affected.

Representative Comment: 11121T, 7481E

Issue 12: *Salmonids*

A Comment: The *Draft Environmental Impact Statement* failed to address the impacts of the National Park Service's "Natural Regulation Policy" (that causes bison and other wildlife overgrazing, which impacts riparian areas and water quality) on salmonid species that are currently being considered for listing under the Endangered Species Act, particularly westslope and Yellowstone cutthroat trout.

Response: The U.S. Fish and Wildlife Service conducted long-term studies of fish, habitat, water chemistry, and aquatic macroinvertebrates of the Lamar River on the northern range (NPS 1997). Anecdotal information regarding fishing in the Lamar Valley area in the last century is suggestive of similar fisheries then and now, but there are, unfortunately, no ecological studies of the Lamar River 100 or 200 years ago against which to compare modern conditions. If the aquatic ecosystem of the Lamar River is being damaged by grazing, the effects are too subtle to be recognized through an examination of the sport fishery (NPS 1997).

Westslope cutthroat trout are found mostly in headwater streams within the Madison and Gallatin River drainages. The Madison bison herd typically grazes at lower elevations than where headwaters occur. Therefore, no potential conflicts should occur between bison grazing and westslope cutthroat trout (Kaeding 1999, pers. comm.). At lower elevations in the Lamar Valley, bison grazing could be affecting stream sedimentation; however, Yellowstone cutthroat trout populations within the park are robust, and if there is an adverse effect, it is not significant (Kaeding 1999, pers. comm.). The landscape in the park is considered young, geologically speaking, and sedimentation into streams is driven more by the geology and weather than by ungulate grazing (NPS 1997).

An examination of a variety of fishery variables compared to bison use found no correlations, but the study was not set up to determine the effects of bison grazing on the fisheries. It was concluded that the impacts of bison grazing on fish populations or catch rate cannot be determined from the available information (Mahoney 1999). A summary of the study was included in the 1997 NPS report referred to above.

Many of the streams in the Greater Yellowstone Area, especially on national forest lands, have nonnative trout such as rainbow, brown, and brook trout (May 1999). The only genetically pure population of westslope cutthroat trout occurs within Cabin Creek, a tributary of the Madison River, that enters the Madison between Hebgen Reservoir and Quake Lake. Bison do not use the Cabin Creek area, and no effects on trout would occur along Cabin Creek (May 1999). Cougar Creek also contains westslope cutthroat trout, but the trout are slightly hybridized and would possibly be treated differently under the Endangered Species Act. Fan Creek, a tributary of the upper Gallatin River, also has westslope cutthroat trout. However, bison do not concentrate in that area, and no effects on the trout would be expected along the upper Gallatin River (May 1999).

Representative Comments: 14305M, and 11121C, N, T

Issue 13: *Trumpeter Swans*

A Comment: Construction of a capture/quarantine facility in a trumpeter swan nesting area under alternative 6 would cause additional loss of habitat. The alleged major adverse effect of alternative 6 on the nesting pair of trumpeter swans at Seven-Mile Bridge could be mitigated to allow establishment of the capture facility.

Response: The *Draft Environmental Impact Statement* discloses that approximately 13 acres of shrub/steppe vegetative community would be disturbed for construction of the capture facility. Potential effects of the facility would be mitigated by ensuring that the facility complied with the siting criteria listed in the *Draft Environmental Impact Statement* (p. 56). The siting criteria are designed to minimize certain disturbances and to eliminate other potential impacts of the facility. Most important to the siting of the facility in an area used by trumpeter swans are two specific siting criteria: (1) facilities would be

located in areas that do not contain significant wetland and riparian areas, or endangered, threatened, rare, and sensitive plant or animal species; and (2) natural and cultural resource surveys to comply with applicable laws would be completed before the facilities were built. Facilities would be located to avoid known sensitive or important cultural and natural resources. Additionally, the capture facility would be located near existing roads, which is an area that trumpeter swans would be unlikely to use for nesting.

Representative Comments: 15545L, 13356L, 9364QQ

Issue 14: ***Wolf/Bison Interactions***

A Comment: Would the introduction of more natural predators (wolves) into the Yellowstone ecosystem benefit bison by controlling illness and population size?

Response: Bison have few natural predators. Grizzly bears and wolves have killed bison, but this is not a common occurrence. An increase in the wolf population would conceivably result in the killing of more bison . Presently, only two wolf packs, the Crystal Creek and Nez Perce packs, have shown an inclination and ability to take bison. The packs are taking too few bison to have any effect on the population. Wolves prefer elk, and the wolf population would probably have to increase significantly before they killed enough bison to affect the park population.

Representative Comment: 5830E

B Comment: Over the long term, what effect will wolf predation have on the bison population? Is there a correlation between the reintroduction of wolves and the recent decreases in the bison herd? Will bison become increasingly important to wolves as more learn to hunt them? There is nothing in the literature to indicate that Yellowstone National Park wolves are not likely to develop a significant prey image for bison calves.

Response: Monitoring by the National Park Service personnel since the reintroduction of wolves has shown that wolves are taking very few bison. Only two wolf packs have shown an inclination and an ability to take live bison (likely young or sickly). These two packs, the Crystal Creek and the Nez Perce, are preying on the Pelican Valley and/or the Mary Mountain herds. Observations from the air indicate that wolves are taking too few bison to significantly affect the Yellowstone bison population.

Observations of wolf pack attacks on bison calves in Wood Bison National Park showed that yearling bulls are more agile and quicker than wolves. The observations showed six yearling bulls and one cow were capable of defending one calf from wolf attack, although the wolves were able to injure the calf in their several attacks (Carbyn and Trottier 1988).

Representative Comment: 13125E, 15332K, 15572C

Issue 15: ***Incomplete Wolf Impact Analysis***

A Comment: The impact analysis for gray wolves lacks authoritative discourse, and mitigation to protect wolves is inadequate.

Response: Mitigation is not deemed necessary for wolves as part of the bison management plan because they are considered an experimental, nonessential population by the U.S. Fish and Wildlife Service. However, as part of the reintroduction program, several rules were established to protect the wolves during their reintroduction. These include prohibiting the taking or possessing of wolves or parts of wolves (with exceptions specified for landowners, livestock producers, states, and tribes), and restricting human access to wolf facilities and wolf habitat (through area closures). Because wolves are an experimental, nonessential population, the impact analysis presented in the *Draft Environmental Impact Statement* is considered adequate.

Representative Comment: 13364BB

B Comment: The analysis of impacts on the gray wolf does not evaluate the implications of one or multiple capture facilities in Yellowstone National Park. The confinement of bison in a quarantine or a capture facility could theoretically act as an attractant to gray wolves. In terms of a vaccination program, particularly if a live vaccine is used, the implications of a wolf's consuming the bacteria after depredating a vaccinated animal must be evaluated.

Response: The impacts of existing facilities on gray wolves are disclosed in the analysis of each alternative in volume 1 "Environmental Consequences: Impacts on Threatened, Endangered and Sensitive Species" and in table 12. The continued operation of existing capture facilities would result in negligible impacts to gray wolves in all alternatives. This impact would be less adverse in the modified preferred alternative as a result of the potential for less capture and handling of bison. Capture or quarantine facilities could be constructed in alternatives 5 and 6, and the modified preferred alternative. Impacts related to these facilities were not specifically discussed in the DEIS impact analysis because these facilities would be sited using criteria identified in the DEIS, (see p. 56). Appropriate surveys and NEPA analyses would occur before a facility would be constructed in any areas, and if potential conflicts with wolves or other threatened, endangered, or sensitive species would be likely, the facility would be redesigned, relocated, or otherwise mitigated. Using this approach, no impacts on gray wolves would occur as a result of new facilities.

Experiences at the three existing capture facilities have not shown that the confinement of bison over a period of several days serves as an attractant for wolves. Wolves only rarely traverse the area at Horse Butte and Duck Creek, but do the range over the Stephens Creek area more regularly. Additionally, people would be required to monitor and maintain the facilities on a regular basis, and wolves would likely not frequent the immediate facility area.

Biosafety research on brucellosis vaccines is currently being conducted. Testing of the vaccine RB51 in coyotes, as surrogates for wolves, has been completed. Testing showed the vaccine persisted in coyotes for six weeks, but did not cause morbidity, mortality, or significant clinical pathology in the coyotes. Based on this research, the National Park Service has concluded that if wolves ingest live vaccine, there would not be adverse effects.

Representative Comment : 14714RR

Issue 16: ***Grizzly Bear Cumulative Impacts***

A Comment: The *Draft Environmental Impact Statement* failed to consider the cumulative effects of reductions in important food sources (e.g., Yellowstone cutthroat trout and whitebark pine seed) and increases in human development of private lands around Yellowstone National Park and human activities in the park (particularly winter use). Grizzly bear experts have stated that these losses would negatively affect grizzly bears under all alternatives except alternative 2.

Response: The analysis documented in the *Draft Environmental Impact Statement* considered the cumulative effects of reductions in important food sources, increases in development, and human activities in and around the park for all alternatives "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species." Additional modelling of the bison population has been conducted since the *Draft Environmental Impact Statement* was released. Results of this modelling, which are presented in "Environmental Consequences: Impacts on Bison Population" in the environmental impact statement, suggest that all alternatives except alternative 5 would maintain a long-term bison population that would be sufficient to maintain the target population of grizzly bears recommended in the *Grizzly Bear Recovery Plan*. New analyses presented in the *Biological Assessment* (USFWS 2000) for the modified preferred alternative more thoroughly documents direct, indirect, and cumulative effects on the grizzly bear. As discussed in the *Biological Assessment* (USFWS 2000) and in "Affected Environment" of this final environmental impact statement, the use of meat from ungulates is expected to increase in

importance to the nutritional well-being of grizzly bears as the availability of whitebark pine seeds, cutthroat trout, and army cutworm moths decreases due, in part, to the loss of habitats. Human actions and activities in the Greater Yellowstone Area will also likely continue to affect grizzly bears. Although direct, indirect, and cumulative impacts may affect the grizzly bear, they are not expected to *adversely* affect the grizzly bear. For a more extensive discussion, refer to cumulative effects on grizzly bears in volume 1, "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species."

Representative Comment: 13,447K, 15,572C, 15,671FF, 15,890B

Issue 17: ***Feed Grizzly Bears with Seropositive Bison***

A Comment: The National Park Service should mitigate carrion reduction by providing bears with seropositive bison. Strategically leave carcasses as winterkill food for emerging grizzly bears.

Response: Yellowstone National Park now relocates the carcasses of winterkilled bison or those killed by vehicles away from roads and residential areas. However, providing carcasses that are not present naturally is considered supplemental feeding, which the National Park Service does not conduct. Legal requirements and the National Park Service *Management Policies* mandate that national parks perpetuate native animal populations against destruction, removal, harassment, or harm through human actions, including supplemental feeding. Instead, maintaining the bison population at a size sufficient to provide carrion to the Greater Yellowstone Area's grizzly bears is a primary goal. Refer to responses under "Wildlife: Predators and Scavengers/Ungulates — Issue 5" for additional information on disposition and use of carcasses.

Representative Comment: 125HH, 9,364QQ, 13,356M

Issue 18: ***Grizzly Bear's Dependence on Bison***

A Comment: Grizzly bears depend on bison carcasses in the spring. Would controlling the number of bison also control or adversely affect the number of grizzly bears by limiting the number of carcasses available for feeding? The loss of these carcasses would have a greater than negligible effect on grizzly bears and would violate the Endangered Species Act.

Response: Controlling or managing the size of the bison population could affect the grizzly bear indirectly by potentially altering the number of winterkilled bison available to grizzly bears as they emerge from hibernation. Alternatives that reduce the number of bison could, to a degree, negatively affect the number of winterkilled bison available for grizzly bears. However, many other factors also affect the number of winterkilled bison, such as the severity of the winter (milder winters result in fewer winterkilled bison) and the overall health of the bison going into a winter.

Based on average forage production, winter severity, and other factors, Yellowstone National Park will support a long-term average of 2,700 bison. However, weather and forage production are quite variable and, correspondingly, the herd size fluctuates between 1,700 and 3,500 (Boyce 1990; Boyce and Gaillard 1992). In alternatives 1, 2, 3, and 4, and the modified preferred alternative, the bison population is expected to fluctuate between 1,700 and 3,500 animals with the mean number of bison remaining at or above 3,000 animals. The mean number of bison is the number above which the 1998 NAS report suggests that bison are more likely to respond to heavy snow or ice by attempting to migrate to winter ranges at lower elevations outside the park. Maintaining the mean number of bison at or above 3,000 animals in these alternatives would be expected to provide grizzly bears with a sufficient number of winterkilled carcasses to contribute to the maintenance of a healthy population of grizzly bears and should not adversely affect grizzly bears. As indicated in issue 1A above, even though bison populations would be slightly reduced in alternatives 4, 6, and 7, the effect on carcasses available for grizzly bears would be negligible. Only alternative 5 would have a moderate to major adverse impact on grizzly bears because of a major reduction in the bison population and subsequently, bison carcasses. Only this alternative would

result in a determination of "may affect — most likely to adversely affect" for grizzly bears and require formal consultation under the Endangered Species Act.

Additionally, grizzly bears in the Greater Yellowstone Area are omnivores whose diets vary seasonally, depending on the availability of sources of food they prefer (e.g., carcasses of bison and elk, whitebark pine nuts, army cutworm moths, and other vegetation). These food sources may exert a positive influence on the grizzly bear's fecundity and survival. Each of these food sources is limited in distribution and is subject to wide annual fluctuations in availability. Thus, the number of grizzly bears and their overall health is determined, to some extent, by the availability of all the various sources of food they eat. Refer to the "Affected Environment" in volume 1 for a full discussion of the grizzly bear's food habits in the Greater Yellowstone Area.

Representative Comment: 15,170B, 15,185AC, 10,575J, 9,025F

B Comment: How many grizzly bears would be fed by the bison that are removed from the ecosystem?

Response: No direct relationship (e.g., 1 to 1 or 1 to 10) exists between the number of bison needed to feed a grizzly bear. As noted in volume 1, "Affected Environment: Threatened, Endangered, and Sensitive Species," grizzly bears in the Greater Yellowstone Area are omnivores whose diets vary seasonally, depending on the availability of sources of food they prefer (e.g., carcasses of bison and elk, whitebark pine nuts, army cutworm moths, and other vegetation). These food sources may exert a positive influence on the grizzly bear's fecundity and survival. Each of these food sources is limited in distribution and subject to wide annual fluctuations in availability. Thus, if the availability of one of these sources decreases, the bears compensate by increasing consumption of the other sources. Because no direct relationship exists, no one can determine how many grizzly bears would be fed by a specific number of bison.

Representative Comment: 15,167B

C Comment: Are grizzly bears becoming increasingly reliant on bison carrion?

Response: Grizzly bears are not necessarily becoming increasingly reliant on bison carrion. Rather, their consumption of bison carrion most likely reflects the availability of the various food sources they prefer. Grizzly bears will eat meat whenever it is available (Mattson 1997). Currently, the Greater Yellowstone Area supports some of the highest native ungulate densities in North America (Mattson 1997). The numbers of winterkilled bison carcasses present each spring reflect these densities. This situation is in direct contrast to previous decades. Until 1968 bison and elk were maintained at low numbers within Yellowstone National Park by direct reductions (Houston 1982). Following termination of this program, numbers of elk and bison increased significantly (Singer and Mack 1993). Changes in climate during the early 1980s to drier winters and wetter summers also may have contributed to this increase (Despain et al. 1986; Engstrom et al. 1991; Balling et al. 1992). The elk herd increased from less than 5,000 animals around 1968 to an estimated 14,000 to 16,000 on the northern winter range in recent years. The bison population also increased by about 400 to 3,900 in 1994 and then decreased to approximately 2,500 in 2000. Grizzly bears in the Yellowstone ecosystem are responding to the increased availability of bison carcasses and, as a result, are unique among interior North American grizzly bear populations in their substantial consumption of ungulates. In contrast, in Glacier National Park more than 95% of the energy intake of both adult male and female grizzly bears is from vegetation (Hilderbrand et al. 1999). For more information regarding grizzly bear diet in the Greater Yellowstone Area, see volume 1, "Affected Environment: Threatened, Endangered, and Sensitive Species."

Representative Comment: 14,869E

D Comment: There is no scientific basis exists for maintaining the bison population at 1,700 to 2,500 animals. Will a larger number be required to support a growing population of grizzly bears?

Response: As noted in volume 1, "Affected Environment," grizzly bears in the Greater Yellowstone Area are omnivores whose diets vary seasonally, depending on the availability of sources of food they prefer (e.g., carcasses of bison and elk, whitebark pine nuts, army cutworm moths, and other vegetation). They are not solely dependent on bison. These varied food sources may exert a positive influence on the grizzly bear's fecundity (e.g., fertility and productivity) and survival. Each of these food sources is limited in distribution and subject to wide annual fluctuations in availability. Thus, the number of grizzly bears and their overall health is determined, to some extent, by the availability of all the various sources of food they prefer. See issue 2 under, "Bison: Population" in this volume for a discussion on how bison population range of 1,700 to 2, 500 animals under alternative 7 was determined. For the modified preferred alternative a bison population limit of 3,000 animals is identified, a population 20% greater than that identified in alternative 7.

Representative Comment: 7,356G

E Comment: Expansion of the bison herd, which is a high-quality source of food for grizzlies, would contribute to the recovery of the grizzly bear.

Response: An expanded bison population is not necessarily needed for recovery of the grizzly bears in the Yellowstone grizzly bear recovery zone. The *Grizzly Bear Recovery Plan* (U.S. Fish and Wildlife Service 1993) identifies three population parameters with goals that must be met prior to removing the grizzly bear from the threatened species list. In 1994 the Yellowstone ecosystem grizzly bear population met all three population recovery goals for the first time. However, mortality goals were exceeded from 1995 through 1997. In 1998 and 1999 all three population recovery parameters were again met. Habitat-based recovery criteria, as well as a conservation strategy that ensures continued protection of the grizzly bear population and habitat, are currently being developed. Once the habitat-based recovery criteria and conservation strategy have been completed, the grizzly bear may be considered for delisting. Thus, expanding the number of bison (alternatives 2 and 3) probably would not benefit the grizzly bear. An in-depth study of overall carrying capacity of the park for bison is ongoing. The target number of bison may be adjusted pursuant to its findings. The study is expected to be complete by late 2001 or early 2002.

Representative Comment: 11,486D, 14,469G

F Comment: The National Park Service needs to determine the park's carrying capacity for bison to help analyze the effects on grizzly bears.

Response: A specific ecological carrying capacity for bison in Yellowstone National Park has not yet been established. However, a population model developed by Boyce (1990) suggests Yellowstone will support a long-term average of about 2,700 bison. Given the natural variations in weather and production of forage combined with a small amount of predation, the bison population is expected to fluctuate between 1,700 and 3,500. Currently, several studies of bison ecology and related research projects are underway, including a project that will synthesize all the available information and develop an ecological carrying capacity for bison in the Greater Yellowstone ecosystem. This work is expected to be completed late in 2001 or early in 2002. Refer to responses under "Bison: Ecology" in this volume for additional information on ecological carrying capacity.

Representative Comment: 331E, 14,833B

Issue 19: ***Dispersal of Grizzly Bears***

A Comment: A healthy population of bison is needed to help subadult grizzlies disperse to other areas. Reducing the number of bison could increase the average age of the female bears' first reproduction and increase the intervals between litters.

Response: The respondent is correct in that bison are an important part of the grizzly bear's diet and the availability of food directly and indirectly affects the bear's mortality in Yellowstone. Overall, army

cutworm moths, elk, bison, cutthroat trout, and whitebark pine seeds are the highest sources of digestible energy and the most important foods available to grizzly bears in the Yellowstone area (Mealey 1975; Pritchard and Robbins 1990; Craighead et al. 1995). These food sources may exert a positive influence on grizzly bear fecundity (e.g., fertility and productivity) and survival. Each of these food sources is limited in distribution and subject to wide annual fluctuations in availability. Ungulate meat may become even more important to the nutritional well-being of Yellowstone's grizzly bears if whitebark pine seeds and cutthroat trout are reduced by introduced exotic organisms. Grizzly bear use of ungulates in the Greater Yellowstone Area is apparently related to the availability and use of whitebark pine seeds (Mattson 1997). Grizzly bears consume more ungulate meat during years when pine seeds are scarce (Mattson 1997); ungulate use is also greater in areas with fewer whitebark pine stands (Mattson 1997). Availability of ungulate meat also may influence levels of human-caused grizzly bear mortality. Numbers of bear/human conflicts and human-caused grizzly bear mortalities are negatively correlated with the availability of high-quality natural foods (Mattson et al. 1992; Gunther et al. 1994, 1997). Thus, maintaining the number of bison at a level that would ensure a sufficient level of carcasses (such as would occur under the modified preferred alternative) would help ensure the availability of adequate sources of food for Greater Yellowstone Area grizzly bears. Additional information on the relationship between grizzly bears and food sources, particularly bison, is presented in the *Biological Assessment* (USFWS 2000) that was prepared for the modified preferred alternative.

Representative Comment: 2,397aB

Issue 20: ***Grizzly Bears with Brucellosis***

A Comment: The National Park Service must acknowledge the blood tests performed on two grizzly bears from the Greater Yellowstone Area that showed positive reactions for exposure to brucellosis and discuss the implications of these tests.

Response: Since at least 1917, brucellosis has been present in various species of wildlife present in the Greater Yellowstone Area, particularly elk and bison (NAS 1998). Grizzly bears scavenging the carcasses of winterkilled elk and bison probably have already been exposed to the field strain of the bacteria. Natural infections with brucellosis in black and grizzly bears in the Greater Yellowstone ecosystem also have been reported in the literature (NAS 1998). If such exposure to brucellosis was negatively affecting the park's population of grizzlies, effects in terms of reductions in the number of bears present in the park and reductions in reproductive success might have been detected previously.

Representative Comment: 14,819Y

Issue 21: ***Incomplete Impact Analysis for Grizzly Bears***

A Comment: The *Draft Environmental Impact Statement* failed to adequately assess the importance of bison in the grizzly bear's diet, particularly to grizzly bears emerging in the spring. Recent studies provide strong evidence that the meat of ungulates (elk and bison) is a significant source of food. As a result, reducing the number of bison could adversely affect the Greater Yellowstone Area's population of grizzly bears.

Response: The information on grizzly bear diet in the *Draft Environmental Impact Statement* has been augmented in the final statement in the "Affected Environment" by additional discussion on the importance of ungulate meat to grizzly bears in the Greater Yellowstone Area. This information was also presented in the *Biological Assessment* (USFWS 2000) for the modified preferred alternative that was prepared and submitted to the U.S. Fish and Wildlife Service in March 2000. The discussion about the importance of ungulate meat to grizzly bears applies equally to all alternatives, although the *Biological Assessment* (USFWS 2000) addresses only the modified preferred alternative.

As presented in the *Biological Assessment*, (USFWS 2000) grizzly bears will eat meat whenever it is available (Mattson 1997). Currently, the Greater Yellowstone Area supports some of the highest native

ungulate densities in North America (Mattson 1997). The numbers of winterkilled bison carcasses present each spring reflect these densities. This situation is in direct contrast to previous decades. Until 1968 bison and elk were maintained at low numbers within Yellowstone National Park by direct reductions (Houston 1982). Following termination of this program, numbers of elk, and bison increased significantly (Singer and Mack 1993). Changes in climate during the early 1980s to drier winters and wetter summers also may have contributed to this increase (Despain et al. 1986, Engstrom et al. 1991, Balling et al. 1992). The elk herd increased from less than 5,000 animals around 1968 to an estimated 14,000 to 16,000 on the northern winter range in recent years. The bison population also increased by about 400 to 3,900 in 1994 and then decreased to approximately 2,500 in 2000. Grizzly bears in the Yellowstone ecosystem are responding to the increased availability of bison carcasses and, as a result, are unique among interior North American grizzly bear populations in their substantial consumption of ungulates. In contrast, in Glacier National Park more than 95% of the energy intake of both adult male and female grizzly bears is from vegetation (Hilderbrand et al. 1999).

The importance of ungulate meat to grizzly bears in the Greater Yellowstone Area has been considered in determining how changes in the bison population may affect grizzly bears. See response 1A above and responses under issue 18 (Grizzly Bear's Dependence on Bison) for additional information on the relationship between bison population levels and grizzly bears in the Greater Yellowstone Area.

Representative Comment: 15,671FF, 14,980T, 14,937B

B Comment: The *Draft Environmental Impact Statement* failed to fully incorporate work by Mattson, Green et al., Gunther, and Haroldson in the grizzly bear impact analysis. Based on their work, alternative 5 could significantly affect grizzly bears.

Response: The analysis documented in the *Draft Environmental Impact Statement* did consider the work of these authors and others. As noted in table 12 (pp. 125–133) and in "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" (p. 275), alternative 5 would have a moderate to major adverse impact on grizzly bears because of the reduction in the bison population. A more thorough discussion of work conducted by these authors, particularly on the importance of ungulate meat to grizzly bears in the Greater Yellowstone Area, is presented in the *Biological Assessment* (USFWS 2000) prepared for the modified preferred alternative and is briefly summarized in the previous response. Although the *Biological Assessment* (USFWS 2000) addresses only the modified preferred alternative specifically, the discussion of material from these authors applies equally to all alternatives. Information from the *Biological Assessment* (USFWS 2000) has been incorporated into the final environmental impact statement in the discussion of grizzly bears in "Affected Environment" and "Environmental Consequences" for the modified preferred alternative.

Representative Comment: 15,420QQ

C Comment: The *Draft Environmental Impact Statement* violates the Endangered Species Act because it does not present data supporting the conclusion under alternative 7 that reducing the number of bison is not significant to grizzlies. Evidence presented at a bear research and management conference indicates that the meat of ungulates is important to grizzly bears.

Response: Analyses from the *Draft Environmental Impact Statement* have been augmented in volume 1, "Affected Environment" with information on the importance of ungulate meat to grizzly bears. This new information was derived from the *Biological Assessment* (USFWS 2000) for the modified preferred alternative that was prepared for and submitted to the U.S. Fish and Wildlife Service in March 2000 as required by the Endangered Species Act. Although the *Biological Assessment* (USFWS 2000) was alternative-specific, much of the information presented was applicable to all alternatives. Responses above summarize the information in the *Biological Assessment* (USFWS 2000) on the importance of ungulate meat to grizzly bears.

In alternative 7 bison numbers would be smaller than in alternative 1; however, because of the assumptions inherent in the deterministic bison population model and the inability to account for stochastic events such as weather, alternative 7 would not be biologically different from alternative 1, and therefore would have a negligible impact on grizzly bears. In the modified preferred alternative, the target bison population of 3,000 would be 20% higher than the range proposed in alternative 7. This population and the resulting distribution of bison would result in a similar overall number of carcasses as under existing management practices and could provide additional bison outside both the north and west boundaries of the park. As a result, foraging opportunities for grizzlies could be improved under the modified preferred alternative in comparison to alternative 7.

Representative Comment: 12,025F, 12,025F

D Comment: The *Draft Environmental Impact Statement* notes that alternative 5 would significantly decrease the availability of bison for grizzly bears. Evaluate each alternative's impacts on this Endangered Species Act protected species, as required by National Environmental Policy Act.

Response: The effects on grizzly bears of changes in the number of bison inhabiting the Greater Yellowstone Area were considered by alternative in the *Draft Environmental Impact Statement*. Table 12 (pp. 125–133) and "Environmental Consequences: Impacts on Threatened, Endangered, and Sensitive Species" (pp. 266–281) identify the impacts of each alternative on each major species, including the grizzly bear. This analysis also identifies that alternative 5 would have a moderate to major adverse impact on grizzly bears because of a rapid reduction in the bison population (p. 276). The structure of the narrative may have caused difficulties in following the analysis. Effects common to all alternatives were presented first to minimize repetition in the document. Then, impact analyses were presented that were specific to each alternative. In addition, to meet the Endangered Species Act's requirements for consultation, a biological assessment on the modified preferred alternative was prepared and submitted to the U.S. Fish and Wildlife Service in March 2000 for its concurrence.

Representative Comment: 15,367O

Issue 22: ***Grizzly Bear Effects on Bison***

A Comment: Grizzly bears apply an "important natural selection pressure on the bison."

Response: Grizzly bears are not an important source of natural selection pressure on bison. Grizzly bears almost exclusively scavenge the carcasses of bison that died of some other cause (e.g., winterkill). Because these animals died from some other cause, grizzly bears did not influence their deaths.

Representative Comment: 15383G

Issue 23: ***Human/Grizzly Bear Conflicts***

A Comment: Evidence suggests that human/bear conflicts increase during years when shortages of food for the bears exist. This causes additional mortalities to grizzly bears, which inhibits their recovery.

Response: Food shortages have been identified as a factor in increased human/bear conflicts and bear mortality. The management of grizzly bears in Yellowstone National Park has been highly successful in promoting grizzly bear recovery and reducing bear/human conflicts and human-caused bear mortality in the park, and this management will continue. All bison management activities and capture facilities proposed for the park under the alternatives would be conducted under these same bear management practices and policies so as to reduce the potential for human-caused bear mortality. Additionally, grizzly bears will eat meat whenever it is available (Mattson 1997), and the Greater Yellowstone Area currently supports some of the highest native ungulate densities in North America (Mattson 1997). The numbers of winterkilled bison carcasses present each spring reflect these densities. This situation is in direct contrast to previous decades. Until 1968 bison and elk were maintained at low numbers within the park by direct

reductions (Houston 1982). Following termination of this program, numbers of elk and bison increased significantly (Singer and Mack 1993). As long as ungulates and other sources of food are available at levels similar to the present, the human-caused mortality of grizzly bears that results from food scavenging would be minimized.

Representative Comment: 9,366B, 15,332J

Issue 24: ***Effects of Hazing on Grizzly Bears***

A Comment: The use of cracker barrels and helicopters would adversely affect denning bears and pregnant females and bears emerging from hibernation.

Response: The actual practice of hazing bison is unlikely to affect bears emerging from their dens. Grizzly bears locate their dens at high elevations in remote areas of Yellowstone National Park and adjoining areas. Winter range for bison, which encompasses the capture facilities and areas where hazing would occur, is present at lower elevations. Thus, the bears' dens and the areas where hazing would occur do not overlap. Additionally, hazing is directed at a focused result — moving the bison to a specifically identified location. Because these movements are focused rather than random, personnel conducting hazing activities move bison only within their winter range and not out in the more remote areas of the park where bears hibernate. Thus, hazing would not affect bears within their dens.

Representative Comment: 15,545U, 15,671O

Issue 25: ***Impacts on Grizzly Bears in a Management Situation 1 Area***

A Comment: Justify how the interagency team can adopt any of the alternative plans that would destroy grizzly bear habitat in a Management Situation Area 1.

Response: All alternatives under consideration would involve very small amounts of habitat distributed across the northern and western borders of the park (likely less than 13 acres per facility). Additionally, most of the facilities, such as the Horse Butte, Duck Creek, and Stephens Creek capture facilities, already exist. Thus, no additional disturbance would be involved with the continued use of these facilities. As discussed in the *Biological Assessment* (USFWS 2000) prepared for the modified preferred alternative, disturbance of habitat as part of bison management activities in management situation 1 areas will not likely affect grizzly bears. Rather, the number and distribution of bison carcasses is the primary concern for grizzly bears, as discussed in previous responses.

Representative Comment: 15,671O

Issue 26: ***Effects of the Land Exchange on Grizzly Bears***

A Comment: The U.S. Forest Service's land swap, involving an area near Mol Heron Creek, would destroy critical habitat for grizzly bears. The effects of this exchange on the grizzly bear need to be analyzed, and consultation with the U.S. Fish and Wildlife Service needs to occur.

Response: Recent land exchanges were considered in the cumulative effects analysis for grizzly bears. Thus, they were analyzed. Consultation with the U.S. Fish and Wildlife Service has been ongoing and is based primarily on the *Biological Assessment* (USFWS 2000) prepared for the modified preferred alternative that has been submitted for their review and concurrence. For more specific details on the consultation process, refer to responses below under issue 30 ("Compliance with the Endangered Species Act").

Representative Comment: 15671PN, 15,545

Issue 27: ***Effects of Hazing on Bald Eagles***

A Comment: The Montana Department of Livestock's hazing activities within a "bald eagle closure area" including the use of helicopters, horses, cracker barrels, and ATVs, has caused high impacts on bald eagles and nesting areas.

Response: Measures currently are in place to mitigate the effects of hazing and capture on bald eagles present near the capture facilities. Specifically, measures have been implemented to mitigate potential adverse effects of the capture facility on the nesting pair of bald eagles near the Horse Butte capture facility. These measures are stratified by distance from the nest (< 400 meters and 400–800 meters). Within 400 meters of the nest, activities are seasonally restricted as follows: no helicopter or shooting activities are permitted between February 1 and August 15, use of snowmobiles is limited to designated trails, hazing is not permitted within ¼ mile of the nest. Between 400 and 800 meters of the nest, activities are seasonally restricted as follows: no helicopter and shooting activities are permitted between February 1 and August 15 and hazing occurs only from snowmobiles or horseback. The U.S. Fish and Wildlife Service in its "Biological Opinion" for the Horse Butte capture facility determined that hazing and capture may affect the bald eagle, but would most likely not adversely affect the eagle. During the winter and early spring, the modified preferred alternative is expected to have less negative impact on bald eagles in the Horse Butte area because this alternative would potentially allow for less hazing and capture of bison when tolerance limits outside the park are not exceeded.

Representative Comment: 15,366U, 15,366HH

Issue 28: ***Effects of Alternative 6 on the Nesting Pair of Bald Eagles at the Seven-Mile Bridge***

A Comment: The construction of a capture facility at Seven-Mile Bridge under alternative 6 would result in a major adverse effect on bald eagles nesting nearby. The agencies need to address mitigation for this effect.

Response: Under alternative 6 measures implemented to mitigate potential adverse effects of the capture facility on the nesting pair of bald eagles would be similar to those implemented for the Horse Butte capture facility. These measures would be stratified by distance from the nest (< 400 meters and 400–800 meters). Within 400 meters of the nest, activities would be seasonally restricted as follows: no helicopter or shooting activities permitted between February 1 and August 15, use of snowmobiles would be limited to designated trails, hazing not permitted within ¼ mile of the nest. Between 400 and 800 meters of the nest, activities would be seasonally restricted as follows: no helicopter and shooting activities permitted between February 1 and August 15 and hazing would occur only from snowmobiles or horseback.

Representative Comment: 14714

Issue 29: ***Manage Bison as a Protected Species***

A Comment: Bison should be listed and managed as a protected species (i.e., threatened or endangered) under the Endangered Species Act for the following reasons: (1) very little of their original range remains; (2) they are a remnant herd of the millions that once occurred in North America; (3) their "periodic migrations" are an integral part of their natural pattern, which is an extension of their "essential component" within the ecosystem; and (4) they are the genetic foundation of many domestic herds.

Response: A petition was received by the U.S. Fish and Wildlife Service in January 1999 requesting that the wild herd of buffalo in Yellowstone National Park be listed as an endangered species in accordance with provisions in section 4 of the Endangered Species Act. Region 6 of the agency was assigned to process the petition. Section 4 of the Endangered Species Act provides that, to the maximum extent practicable, the U.S. Fish and Wildlife Service has 90 days to decide whether a petition contains substantial information that would indicate that the petitioned action may be warranted. Because the region was processing higher priority actions (in accordance with the "Listing Priority Guidance"

document published in the *Federal Register* on May 8, 1998, 63 FR 22502), work on the bison petition was delayed and was not expected to begin until late 1999.

According to section 4(a) of the Endangered Species Act, a species may be listed as endangered or threatened because of any of a number of factors, including destruction of habitat, overutilization, disease or predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors are affecting its continued existence. Section 4(b) requires that the listing determination be made solely on the basis of the best scientific and commercial data available, following a review of the status of the species and taking into account any efforts being made to protect the species by a state, foreign nation, or political subdivision of a state.

The genetic characteristics of the Yellowstone bison population, the bison's function within the Greater Yellowstone ecosystem, and the limited amount of range that is currently remaining for their use are all factors, among others, that could be considered in making a listing determination. The results of NPS research efforts are expected to provide a wealth of information on the health and status of the Yellowstone bison population and could be used by the U.S. Fish and Wildlife Service, among many other sources, to make a listing determination on the Yellowstone bison. Some of these research efforts will provide additional information on the genetic structure of the Yellowstone bison population compared to that of other NPS herds and determine the effects of various management actions on the Yellowstone bison genetics. Other research projects are being conducted to examine the relationships among bison, forage, and weather, to describe seasonal movements and habitat use of bison and bison population structure, and to synthesize information on bison ecology and biology to model how the population functions in the Greater Yellowstone Area. Additionally, the National Academy of Sciences, National Research Council, a group of approximately 12 experts from various fields, is currently reviewing all available science related to the management of ungulates and the ecological effects of ungulates on the rangeland of the park in order to provide recommendations for implementation by the National Park Service.

Representative Comment: 13230G, 11514B, 16325C, 1006K, 14439G, 16680A, 9112A, 2014B, derived from 2014B and 9112A)

B Comment: Alternative 7 does not address the public trust doctrine's goal of protecting and preserving wildlife (bison) before it reaches a critical listing as either an endangered or threatened species. It does not protect the bison from someday being qualified for listing under the Endangered Species Act.

Response: One of the nine objectives used to evaluate the reasonableness of each alternative proposed, including alternative 7, was stated as follows on page 29 of the *Draft Environmental Impact Statement*: "At a minimum, maintain a viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms." The *Draft Environmental Impact Statement* further states that currently available information indicates that the bison population should be maintained above 580 animals in order to preserve minimum genetic integrity. Very little information is currently available as to what constitutes a minimum viable population for bison or specifically for the Yellowstone bison population. Updated information on genetics was provided in the final environmental impact statement, volume 1, "Affected Environment: Bison Population — Genetics."

A bison population ranging from 1,700 to 2,500 bison is analyzed in alternative 7. The alternative states that if the bison population declines or is reduced to near 1,700 animals, lethal management actions would be ceased or greatly reduced to prevent the population from dropping below that number. The target population for the modified preferred alternative, is approximately 3,000 bison. Thus, in either alternative, the bison population would be maintained at a number well above the 580 bison that would be required to prevent inbreeding and potential loss of genetic diversity.

To determine if the current bison population numbers and genetic characteristics warrant the listing of bison as threatened or endangered, region 6 of U.S. Fish and Wildlife Service is currently processing a recent petition in accordance with provisions in section 4 of the Endangered Species Act.

Representative Comment: 12017EJ

C Comment: The *Draft Environmental Impact Statement* failed to address the combined effects on the genetic viability of bison in violation of the Endangered Species Act.

Response: The Endangered Species Act does not apply to the Yellowstone bison population because the bison are not listed as threatened or endangered, nor are they currently proposed for listing (see response 29B above).

Maintaining a viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms, was an objective that was stated in the *Draft Environmental Impact Statement* (p. 29) and used to evaluate the reasonableness of each alternative. Information available when the *Draft Environmental Impact Statement* was prepared indicated that the bison population should be maintained above 580 animals in order to preserve minimum genetic integrity. All alternatives meet this criterion. However, because the Yellowstone bison population may be genetically important, the National Park Service is committed to conducting research on the genetics of bison in Yellowstone. Research projects are currently underway to analyze the genetic structure of the Yellowstone bison population, to compare the results with that of other National Park Service herds, and to determine the effects of various management actions on the Yellowstone bison genetics. The agencies have stated that they will re-evaluate the minimum population size when new information becomes available. (Refer to responses under "Bison: Population" in this volume.)

Representative Comment: 15545F, 2014B

Issue 30: ***Compliance with the Endangered Species Act***

A Comment: The *Draft Environmental Impact Statement* lacks the analytical data required to fulfill Endangered Species Act requirements.

Response: Section 7 (a)(2) of the Endangered Species Act requires that a federal agency shall use the best scientific data available to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of an endangered or threatened species, or result in the destruction or adverse modification of critical habitat. The National Park Service believes it used the best scientific data available to determine potential impacts on listed species when the *Draft Environmental Impact Statement* was prepared. The National Park Service is committed to ongoing research related to bison management issues, including the effects on other species. Current research projects in Yellowstone National Park, include the evaluation of seasonal movements and habitat selection of bison, the impacts of winter road grooming on bison movements, the impacts of winter recreation on wildlife, and the safety of a brucellosis vaccine in nontarget wildlife species. Some of this updated research was used to prepare a biological assessment on the modified preferred alternative. This biological assessment was submitted to the U.S. Fish and Wildlife Service for its concurrence on the determinations of effect for the grizzly bear, gray wolf, Canada lynx, whooping crane, and bald eagle. See volume 1, appendix D for a summary and status report of bison research projects that are occurring or proposed in Yellowstone and Grand Teton National Parks.

Representative Comment: 1063A

B Comment: Alternative 7 requires formal consultation with the U.S. Fish and Wildlife Service because of the reduction in bison numbers and because such a reduction could directly impact grizzly bears and wolves.

Response: The Endangered Species Act requires that a biological assessment be prepared for the proposed agency action. Since the time the *Draft Environmental Impact Statement* was released for public review, a modification of the preferred alternative has been written and identified as the proposed agency action. A biological assessment was prepared for the modified preferred alternative in accordance with

section 7(c) of the Endangered Species Act and submitted to the U.S. Fish and Wildlife Service in March 2000 for its concurrence.

The modelling results presented in the *Biological Assessment* (USFWS 2000) indicate that the modified preferred alternative would maintain a bison population in the park similar to alternative 1 (or existing management practices). However, the population under the modified preferred alternative would be maintained with tolerance of up to 100 bison outside the north and west park boundaries. The enhanced stochastic model projected that, during the winters between 2002 and 2014, an average of 10 to 20 bison would remain outside the park at Reese Creek (when cattle grazing would cease north of the park boundary) and 10 to 12 bison would remain outside the park at West Yellowstone. This would result in a slightly altered distribution of bison and the possibility of more winterkilled bison being available as carrion.

Gray wolves could experience very slight or undetectable effects due to this slightly different distribution of bison and winterkill carrion under the modified preferred alternative. The bison allowed during the winter in the Stephens/Reese Creek area could provide slightly more carrion for wolves in the north zone management area. Additional carrion could result in a negligible benefit for the Chief Joseph and Sheep Mountain wolf packs (and rarely, the Leopold pack) that range in the area. In the past, winterkilled bison carcasses were very limited in the Reese Creek area. An average of 10 to 12 bison would occur outside the park after 2004 in the West Yellowstone area. This is a somewhat lower number than under alternative 1, and therefore, slightly less carrion might be present for wolves in this area. Wolf prey is 85% to 90% elk and very limited with respect to bison (Smith, pers. comm.). Consequently, the proposed action would likely have negligible to undetectable effects on wolf distribution and prey consumption and is not likely to adversely affect the gray wolf.

Similar to the impacts associated with the wolves, the altered distribution of bison outside the park in the Reese Creek and West Yellowstone area during the winter may affect grizzly bears. Because bison would be allowed to winter in these portions of winter range from which they were previously hazed back into the park, a limited increase in the number of winterkilled carcasses could occur in these areas. These carcasses might attract the attention of some opportunistic bears and entice them into these areas more often than would occur under alternative 1. However, this slightly altered distribution of carcasses is not expected to negatively alter the overall availability of bison carcasses for the grizzly bear in the analysis area.

Representative Comment: 10540F, 5632G, 5671O

C Comment: All alternatives could displace grizzly bears, wolves, and other animals from areas near bison management activities. Was this considered, in accordance with Endangered Species Act?

Response: Table 12 in the *Draft Environmental Impact Statement* did indicate that grizzly bears and wolves would be displaced by bison management activities, but that the effects would be negligible for all alternatives except alternative 5. The biological assessment for the modified preferred alternative, prepared in accordance with section 7(c) of the Endangered Species Act, further determined that bison management actions would not be likely to affect gray wolves and may affect, but are not likely to adversely affect, grizzly bears.

The findings in the *Biological Assessment* (USFWS 2000) indicate that continued operation of the three capture facilities and associated human activities could displace wolves during winter operations. However, wolf activity in these areas is nonexistent to extremely limited, and wolves may already be acclimated to the presence of these facilities and may have already modified their behavior. The grassland and steppe communities do not offer as much cover for wolves as do forested areas, and these areas may be less attractive for wolves. Therefore, potential effects on wolves are considered negligible. Similar to wolves, grizzly bear activity in the vicinity of the capture facilities is limited or nonexistent. Most human activities associated with the capture facilities would occur when grizzly bears are hibernating, although some operations may occur in November and April, when bears are active. However, because little or no

grizzly activity occurs in these areas, impacts would be negligible. Potential grizzly bear displacement related to bison distribution is addressed in responses above.

Representative Comment: 6626G

D Comment: By allowing trail grooming and snowmobiling, the agencies may be in violation of the Endangered Species Act. Allowing trail grooming, more bison survive the winter reducing the carrion for bear through natural winterkill, impairing their feeding. Isn't this considered a "taking"?

Response: In accordance with section 7(c) of the Endangered Species Act, a biological assessment was prepared for the proposed agency action (the modified preferred alternative) and was submitted to the U.S. Fish and Wildlife Service in March 2000. This alternative would result in a bison population similar to population levels anticipated under alternative 1, although the distribution of bison could be slightly altered outside the park in the Reese Creek and West Yellowstone areas. As a result, a limited increase in the number of winterkilled carcasses could occur in these areas, attracting the attention of some opportunistic bears. This slightly altered distribution of carcasses may affect, but is not likely to adversely affect, the grizzly bear because the overall availability of bison carcasses would remain the same. Any effect on bison carcasses under the modified preferred alternative would be a result of bison management activities and not of winter use activities.

Trail grooming and snowmobiling are winter use activities that are evaluated in the NPS (1999a). Public comments on the draft plan are currently being evaluated; therefore, the status of the preferred alternative is unknown. When the preferred alternative (or proposed action) is identified, a biological assessment will be prepared in accordance with section 7(c) that will consider the cumulative effects of the *Winter Use Plan* and the final bison management plan on the grizzly bear. If the analysis results were similar to the findings of the biological assessment for the modified preferred alternative, the National Park Service would seek U.S. Fish and Wildlife Service concurrence that winter use activities "may affect — not likely to adversely affect" the grizzly bear. In this case, a taking would not occur. If a "may affect — likely to adversely affect" determination for the grizzly bear or any other listed species should occur related to winter use activities, the National Park Service would enter into formal consultation, and the U.S. Fish and Wildlife Service would issue a biological opinion.

Representative Comment: 11532F

E Comment: The existing *Interim Bison Management Plan* (alternative 1), alternative 7, and the remaining alternatives, if continued or implemented, would result in an adverse impact, a take, jeopardizing the survival and recovery of the grizzly bear. The agencies must pursue formal consultation over the potential impacts of winter use activities on the threatened grizzly bear. In addition, snowmobile use of the parks and forest should be terminated until the consultation process is complete. This is not just a potential impact that the agencies may attempt to mitigate, but the impact — the take — is occurring now as a result of the *Interim Bison Management Plan*.

Response: For a discussion of impacts of winter use activities on grizzly bears see issue 30D above and NPS and State of Montana (1996). That finding indicated that the U.S. Fish and Wildlife Service concurred with the National Park Service determination that the interim plan would not likely adversely affect grizzly bears; therefore, formal consultation was not required, and no "taking" was identified.

The only alternative of the *Draft Environmental Impact Statement* that would result in an adverse impact on the grizzly bear is alternative 5 (DEIS, p. 266). However, this alternative is not the proposed agency action. As required by section 7(c) of the Endangered Species Act, a biological assessment was prepared for the proposed agency action (the modified preferred alternative) as presented in the final environmental impact statement. In this assessment, a determination was made that this action is not likely to adversely affect the grizzly bear (see response to issue 2D for specific details). If the U.S. Fish and Wildlife Service agrees with the determination of effect, it will issue a letter of concurrence. If it does not concur, a biological opinion would be issued as described in section 7(b)(3)(A) of the Endangered Species Act. This

opinion would suggest reasonable and prudent alternatives that the agencies could take to avoid the likelihood of jeopardy to the species or adverse modification of critical habitat and to minimize "take" to the species. An incidental take permit could accompany the biological opinion, which would allow some impact on the grizzly bear as long as the incidental take did not reach the level of "jeopardy" or "adverse modification" (refer to sections 7(b)(4) and 7(o)(2) of the Endangered Species Act). A record of decision for this final environmental impact statement will not be signed until consultation with U.S. Fish and Wildlife Service has been completed.

Representative Comment: 14714

Issue 31: ***Formal Consultation with the U.S. Fish and Wildlife Service***

A Comment: The agencies should initiate formal consultation with the U.S. Fish and Wildlife Service.

Response: A biological assessment has been prepared in accordance with section 7(c) of the Endangered Species Act. Findings in the *Biological Assessment* (USFWS 2000) indicate that there would be either "no effect" or "may affect — not likely to adversely affect" determinations for the grizzly bear, bald eagle, gray wolf, whooping crane, and lynx. If the U.S. Fish and Wildlife Service concurs with these findings, no formal consultation will be required. However, if that agency determines that a "may affect — is likely to adversely affect" determination is likely for any of the forementioned listed species, then formal consultation would be initiated and the U.S. Fish and Wildlife Service would issue a biological opinion on the biological assessment for the modified preferred alternative.

Representative Comment: 15420QQ

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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United States
Department of the Interior

National Park Service