USDA Agricultural Research Service
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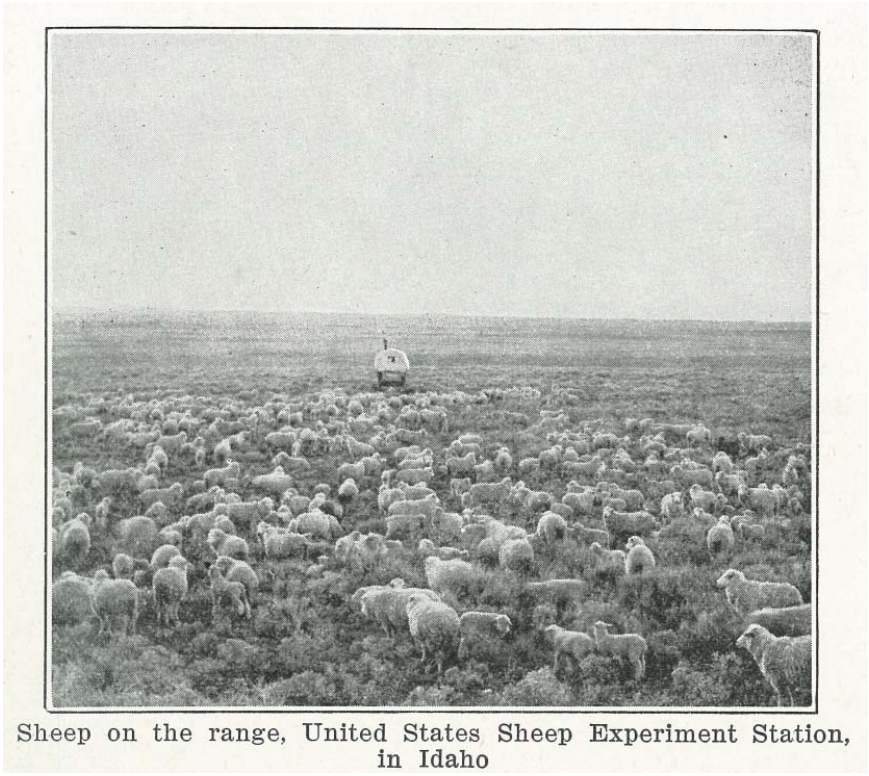
United States Department of Agriculture
Agricultural Research Service
Pacific West Area
July 2011

Draft Environmental Impact Statement

U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010

United States Sheep Experiment Station
Dubois, Clark County, Idaho



Sheep on the range, United States Sheep Experiment Station, in Idaho

Horlacher, Levi J. and Hammonds, Carsie , 1936. ***Sheep*** . published by The Commercial Printing Company, Lexington, KY. 305 pages. The photo appears on page 5.

Where is this project in the NEPA process?

NEPA is a decision-making process. An acronym for the National Environmental Policy Act of 1969, NEPA provides opportunities for interested parties to give their ideas and opinions about federal actions. The following explains the steps of the NEPA process, and where the attached proposal is in that process.

_____ Step One - Need for a Project

The Agricultural Research Service or some other entity may identify the need for a project.

_____ Step Two - Develop Project Proposal

The Agricultural Research Service or a project proponent develops detailed, site-specific proposal.

____ Step Three - Scoping (Public Input)

The Agricultural Research Service solicits public input on the site-specific proposal to define the scope of environmental analysis and range of alternatives to be considered.

_____ Step Four - Develop Reasonable Range of Alternatives

Scoping determines need for an EA: Agricultural Research Service develops alternatives that meet the purpose and need identified for the project.

Step Five – Information for Formal Public Comment Period

Agricultural Research Service performs analysis of environmental effects, identifies preferred alternative, and *may* solicit formal public comment.

_____ Step Six – Environmental Analysis & Decision

Agricultural Research Service finalizes the environmental analysis and makes decision to implement one of the alternatives.

_____ Step Eight - Implementation

Agricultural Research Service implements the project.

_____ Step Nine - Monitor and Evaluate

Agricultural Research Service monitors and evaluates project results.

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U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010

Draft Environmental Impact Statement

Lead Agency: **USDA Agricultural Research Service**

Responsible Official: **Dr. Andrew C. Hammond,**
Director
USDA, ARS, Pacific West Area
800 BUCHANAN STREET
Albany, CA 94710

For Information Contact: **Sue Wingate**
IDT leader
Email: swingate01@fs.fed.us

Abstract: The Agricultural Research Service is considering the following alternatives to meet the purpose and need of the US Sheep Experiment Station, Dubois, ID, to achieve the research goals and objectives (to develop integrated methods for increasing production efficiency of sheep and simultaneously to improve the sustainability of rangeland ecosystems) of the U.S. Sheep Station Experiment Station in Dubois, Idaho.

- Alternative 1 - Proposed Action – No New Federal Action: **Preferred Alternative**. This alternative proposes no new federal action, just a continuation of the historic and ongoing grazing and associated activities necessary to achieve the mission of the station.
- Alternative 2 - All sheep would be maintained at the Mud Lake Feedlot where harvested feeds would be fed daily to meet the nutrient needs of the sheep. No grazing would occur on the Headquarters, East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek.
- Alternative 3 - No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek.
- Alternative 4 –No grazing would occur on the East Summer Range as well as on the Meyers Creek Allotment.
- Alternative 5 –No grazing would occur on Snakey Kelly and Bernice Allotments.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative or judicial review.

Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial review.

Send Comments to: **Dr Andrew Hammond USSES@ars.usda.gov**

Subject Line: **USSES 2010 DEIS Public Comments**

Date by which Comments Must Be Received: **45 days from the publication of the NOA in the Federal Register**

Summary

The Dubois, Idaho US Sheep Experiment Station (USDA, ARS Sheep Station) proposes to continue historic and ongoing grazing and associated activities in order to achieve their mission of research goals and objectives (to develop integrated methods for increasing production efficiency of sheep and simultaneously to improve the sustainability of rangeland ecosystems). The sheep research station (Headquarters, Henninger and Humphrey Ranches) is located in the upper Snake River plain at the foothills of the Centennial Mountains, approximately six miles north of Dubois, Idaho, which is the Clark County seat. The East and West Summer Ranges are in the Centennial Mountains of Montana (Beaverhead County). Through memoranda of understanding, the Sheep Station also utilizes the Mudlake Feedlot (Department of Energy) and several allotments: Bernice (BLM); and Meyers Creek, East Beaver Creek, Snakey Canyon, and Kelly Canyon (Forest Service).

The project area includes:

- 27,930 acres of ARS property at Headquarters, which has office, laboratory, animal, equipment, and residential buildings, dry-lot facilities for research throughout the year, lambing facilities, and lands used for spring and autumn grazing and rangeland research;
- Approximately 16,600 acres of [unsurveyed] Agricultural Research Service property in the Centennial Mountains of Montana, which is used for summer grazing and rangeland research;
- 2,600 acres of ARS property at the Humphrey Ranch in Idaho, which is near Monida, Montana, has animal facilities and equipment buildings, and is used for spring, summer, and autumn grazing and rangeland research; and
- 1,200 acres of ARS property at the Henninger Ranch near Kilgore, Idaho, which has animal facilities and is used for summer grazing and rangeland research.

The lands range in elevation from approximately 4,800 feet to nearly 10,000 feet, with average annual precipitation that ranges from approximately 10 inches in the Snake River plain to greater than 21 inches in the Centennial Mountains. Because of its diverse geography, the Sheep Station has lands that contain subalpine meadow, foothill, sagebrush steppe, and desert shrubland ecosystems. This diversity provides unparalleled research opportunities within the Agricultural Research Service.

This project was undertaken to maintain compliance of operations at the Sheep Experiment Station with the National Environmental Policy Act. On November 28, 2008, Dr. Andrew Hammond, Agricultural Research Service, Pacific West Area Director, signed the *Decision Notice for the Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project Environmental Assessment* (USDA 2008). This decision allowed the Sheep Station to continue historic and ongoing grazing operations through March 2010, the time estimated to prepare a longer term environmental assessment of our grazing and associated activities project. On September 21, 2009, the Federal District Court in Missoula issued an order enjoining and vacating the delisting of the Greater Yellowstone Area grizzly population. In compliance with this order, the Yellowstone grizzly population is once again a threatened population under the Endangered Species Act. At the time of the relisting of the grizzly, ARS was in the process of preparing an environmental assessment for sheep grazing and associated activities that to be carried out on ARS Sheep Station properties in Idaho and Montana. To maintain compliance with the National Environmental Policy Act during the preparation of the EIS, the ARS issued a new interim decision (March 31, 2010) on sheep grazing based on the *Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project Environmental Assessment* (2008) as amended by the *Supplemental Information Report* (March 2010). The *Supplemental Information Report* contains analysis and data gathered during the preparation of the *U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009* draft environmental assessment which was issued for public comment December 14, 2009 – January 25, 2010. The new interim decision extended grazing activities through March 31, 2012.

Public involvement included Scoping and 30-day comment on the Interim EA and 2009 EA, as well as Scoping for this DEIS. Public concerns voiced during the preparation of the original Interim EA, and restated through subsequent public involvement, were used to develop the following alternatives to the proposed action (Alternative 1) including:

- Alternative 1 - Proposed Action – No New Federal Action: **Preferred Alternative**. This alternative proposes no new federal action, just a continuation of the historic and ongoing grazing and associated activities necessary to achieve the mission of the station.

- Alternative 2 - Considered a “no grazing” alternative: Alternative 2 was developed in response to the public suggestion that sheep grazing be eliminated completely from the Sheep Station operation. All sheep would be maintained at the Mud Lake Feedlot where harvested feeds would be fed daily to meet the nutrient needs of the sheep. No grazing would occur on the Headquarters, East Summer Range, West Summer Range, Henninger Ranch, and Humphrey Ranch as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek.

- Alternative 3 - Developed in response to the public suggestion that grazing be eliminated in the Centennial Mountains. No grazing would occur on the East Summer Range, West Summer Range, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek.

- Alternative 4 – Developed in response to the public suggestion that grazing be eliminated adjacent and within in the grizzly bear primary conservation area. No grazing would occur on the East Summer Range as well as on the Meyers Creek Allotment.

- Alternative 5 –Developed in response to the public suggestion that grazing be eliminated adjacent and within in the grizzly bear primary conservation area. No grazing would occur on Snakey Kelly and Bernice Allotments.

Major conclusions are displayed in the following tables:

Table S1. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
U.S. Sheep Experiment Station National Action Plans 101 and 215 (See pages 16-18)				
NP 101 Action Plan **Component 1: Understanding, Improving, and Effectively Using Animal Genetic and Genomic Resources** Problem Statement 1B**:** Identify Functional Genes and Their Interactions. Problem Statement 1D**:** Develop and Implement Genome-Enabled Genetic Improvement Programs. Activities linked with this component**:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement **Component 2: Enhancing Animal Adaptation, Well-Being and Efficiency in Diverse Production Systems** Problem Statement 2A**:** Enhance Animal Well-Being and Reduce Stress in Livestock and Poultry Production Systems. Problem Statement 2B**:** Reducing Reproductive Losses. All activities linked with this component would occur, and the research associated with this component would continue Problem Statement 2C**:** Improving Efficiency of Nutrient Utilization and Conversion to Animal Products. Activities linked with this component**:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management **Component 3: Measuring and Enhancing Product Quality** Problem Statement 3A**:** Developing Systems for Reducing Variation in Product Quality and Yield. **Activities linked with this component**: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: All activities linked with these components would occur, and the research associated with these components would continue	GREATEST IMPACT TO PROGRAM; DOES NOT MEET: Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Reduction in sheep numbers would adversely affect some existing research. Would preclude genetic evaluation of sheep that are intended for lands west of the 100th meridian. Would preclude research	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Reduction in sheep numbers could adversely affect some existing research. Would preclude genetic evaluation of sheep that are intended for lands west of the 100th meridian.	MEETS SOMEWHAT: Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Reduction in sheep numbers could adversely affect some existing research. Would preclude or limit genetic evaluation of sheep that are intended for lands west of the 100th meridian. Would limit genetic evaluation of sheep that are intended for lands west of the 100th meridian.	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Reduction in sheep numbers could adversely affect some existing research. Would limit genetic evaluation of sheep that are intended for lands west of the 100th meridian. Would preclude or limit research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of

Table S1. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products Would preclude research involving prescribed burning, seeding, and cattle and horse grazing activities that influence availability of nutrients on western U.S. rangelands and, thus, the well-being of sheep.	Would preclude research into predator avoidance and abatement Would preclude research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products Would limit research involving seeding and cattle and horse grazing activities that influence availability of nutrients on western U.S. rangelands and, thus, the well-being of sheep	Could limit research into predator avoidance and abatement. And would limit predator avoidance and abatement that maintains safe and productive environments for research sheep. Would somewhat limit research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would somewhat limit research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products	sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude or limit research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products

Table S1. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
NP 215 (Formerly 205) Action Plan **Component 1: Rangeland Management Systems to Enhance the Environment and Economic Viability.** Problem Statement A**:** Need for economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems. Problem Statement B**:** Need for improved livestock production systems for rangelands that provide and use forages in ways that are economically viable and enhance the environment sustainable. Problem Statement C**:** Need for improved rangeland restoration, rehabilitation and mitigation practices, germplasm, tools and strategies to restore rangeland integrity in a manner that is economically feasible and environmentally acceptable. **Activities linked with this component:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management **Component 2. Pasture Management Systems to Improve Economic Viability and Enhance the Environment** Problem Statement D**:** Need for appropriate plant materials to improve the economic viability and enhance the environment in pasture-based livestock systems. Problem Statement J**:** Need for economically viable, energy efficient and environmentally enhancing production systems for establishing, growing, maintaining, harvesting, treating, storing and transporting forages for livestock, bioenergy, bioproducts and conservation objectives. **Activities linked with this component:** Sheep grazing, seeding, and integrated pest management				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: All activities linked with these components would occur, and the research associated with these components would continue	GREATEST IMPACT TO PROGRAM; DOES NOT MEET Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Reduction in sheep numbers would adversely affect some existing research. Would preclude research involving economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems. Would preclude activities	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Reduction in sheep numbers could adversely affect some existing research. Would limit research involving economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems.	MEETS SOMEWHAT: Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Research currently involving these areas and some sheep grazing and predator avoidance and abatement could not occur Would limit research involving economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems. Would preclude or limit activities necessary for developing	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Research currently involving these areas could not occur. Reduction in sheep numbers could adversely affect some existing research.

Table S1. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would preclude seeding Required to evaluate restoration, rehabilitation, and mitigation activities to manage disturbed sites (e.g., road sides, firebreaks, historical borrow pits, and mines) that may be susceptible to weed invasion or erosion. Would preclude sheep grazing, prescribed burning, seeding, cattle and horse grazing, and integrated pest management components necessary to developing rangeland monitoring tools. Seeding, prescribed burning, and sheep grazing activities are needed to evaluate plant species that are developed for rangeland improvement programs. Would preclude predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives. Would preclude activities required to plant, establish, maintain, and evaluate forages.	Would preclude or limit activities necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude or limit cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would preclude or limit seeding required to evaluate restoration, rehabilitation, and mitigation activities to manage disturbed sites (e.g., road sides, firebreaks, historical borrow pits, and mines) that may be susceptible to weed invasion or erosion. Would preclude or limit sheep grazing, prescribed burning, seeding, cattle and horse grazing, and integrated pest management components necessary to developing rangeland monitoring tools. Seeding, prescribed burning, and sheep grazing activities are needed to evaluate plant species that are developed for rangeland improvement programs. Would preclude or limit predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives. Would preclude or limit activities required to plant, establish, maintain, and evaluate forages.	management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude or limit cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would or limit predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives.	

Table S1. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Purpose and Need To provide for the continuation of historic and ongoing grazing and associated activities at the Sheep Station in support of the mission of the ARS, USSES in Dubois, Idaho.				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: Continuation of historic and ongoing grazing and associated activities at the USSES Station in support of the mission of the ARS, USSES in Dubois, Idaho would occur.	GREATEST IMPACT TO PROGRAM; DOES NOT MEET: Historic and ongoing grazing and associated activities at the Sheep Station would not occur. Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Because sheep numbers would be decreased by 65% and essentially all grazing and supporting activities would be eliminated, research would essentially be terminated.	MEETS SOMEWHAT Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Because sheep numbers would be decreased by 30% and all grazing at high elevations, grazing elsewhere, and supporting activities would be eliminated or altered, research would be severely limited.	MEETS SOMEWHAT: Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Because some grazing at high elevations, grazing elsewhere, and supporting activities would be eliminated or altered, research could be limited.	MEETS SOMEWHAT: Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Because sheep numbers would be decreased by 20% some grazing, and supporting activities would be eliminated or altered, research could be limited.

Table S2. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey Kelly and Bernice Allotments
Range				
Headquarters/Humphrey /Henninger/East and West Summer Range - Continued current grazing would have little effect on this range Mud Lake Feedlot/ Snakey, Kelly, Bernice, and Meyers Creek Allotments - No change is expected from continued current management	Ending grazing would have little effect on Headquarters, Humphrey, and East Summer /West Summer. Weed control would not continue, and this could result in increasing weed populations On Henninger, range vegetation condition would probably move to fair with an upward trend. Invasive weed control and fence maintenance would not continue. Smooth brome (non-native grass) would remain on site and could replace some native species. Mud Lake Feedlot, Snakey, Kelly, Bernice, and Meyers Creek Allotments - no change is expected from continued current management.	Headquarters/Humphrey East Summer /West Summer Ending grazing would have little effect on these range properties Mud Lake Feedlot - Continued growing season use of available AUMs could reduce more palatable plants, affect species diversity and create conditions more favorable for noxious weeds. Snakey, Kelly, Bernice, and Meyers Creek Allotments – Ending grazing would have little effect	Headquarters - although much of the forage would be provided by increased use on property, forage use is well within acceptable standards and would provide desirable range conditions. Henninger - Forage use would be reduced, deferred grazing during the growing season would be lost and could affect species diversity. Smooth brome could spread to new areas. Humphrey/Summer West and Mud Lake Feedlot, Snakey, Kelly, and Bernice, – Same as alternative 1. East Summer Range and Meyers Creek Allotment – Same as alternative 2	Headquarters/Humphrey/ Henninger/East Summer/ West Summer and Mud Lake Feedlot, and Meyers Creek Allotment Effects same as alternative 1. Snakey, Kelly, and Bernice Allotments – Same as alternative 2

Table S2. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Federally-Listed Wildlife Species				
Canada Lynx (Lynx canadensis) U. S. Sheep Experiment Station Grazing and Associated Activities Project 2011, "may affect, but is not likely to adversely affect Canada lynx." The project would have "No Effect" on critical habitat as none is present or proposed within the project area.				
For all alternatives there is a very low probability of Canada lynx occurrences on Agricultural Research Service properties				
Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.	Elimination of all grazing and associated activities in the Centennial Range would eliminate the potential effects	Elimination of all grazing and associated activities in the Centennial Range would eliminate the potential effects	Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.	Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.
***Grizzly Bear* (*Ursus arctos horribilis*)**				
"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"	"No Effect" on the Yellowstone Distinct Population Segment of grizzly bears	"No Effect" on the Yellowstone Distinct Population Segment of grizzly bears	"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"	"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"
Gray Wolf (Canis lupus) Northern Rocky Mountain Distinct Population Segment. Currently not a listed species. Determination applies if returned to previous federal status of nonessential experimental population)				
"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"
Other Wildlife Species				
Rocky Mountain Bighorn Sheep (Ovis canadensis canadensis) Not a federally listed species. State game species with controlled hunts in some areas				
Not directly affected by grazing on any of the ARS properties	Removal of Sheep Station grazing on the Bernice and Snakey/Kelly allotments would reduce one potential vector of respiratory disease transmission. It is speculative that this alternative would result in an observable change in the existing bighorn sheep herds' condition, health, or population.	Not directly affected by grazing on any of the ARS properties	Not directly affected by grazing on any of the ARS properties	Removal of Sheep Station grazing on the Bernice and Snakey/Kelly allotments would reduce one potential vector of respiratory disease transmission. It is speculative that this alternative would result in an observable change in the existing bighorn sheep herds' condition, health, or population.

Table S2. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Greater Sage-grouse (Centrocercus urophasianus) Currently not a listed species, details included in the Wildlife Report				
Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.	Eliminates direct disturbance and displacement of grouse, but also eliminates benefit that maintain leks and improves habitat mosaic between forbs, grasses, and shrubs.	Larger number of sheep on headquarters and Henninger for longer duration increase disturbances to sage-grouse.	Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.	Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.
Pygmy Rabbit (Brachylagus idahoensis) Currently not a listed species, details included in the Wildlife Report				
Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.	Pygmy rabbits would persist with population numbers and trends slightly increased from the current condition. Eliminates any sheep interaction with or displacement of pygmy rabbits.	Pygmy rabbits would persist with population numbers and trends slightly reduced from the current condition. Longer temporal disturbances from sheep with additional displacement of pygmy rabbits.	Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.	Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.
Connectivity habitat for wide- ranging carnivores (Concern brought up during public scoping). Details included in the Wildlife Report				
Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.	Carnivore use of the Centennial Mountain range would continue similar to the current condition, with additional potential for black bears and wolves to more fully utilize the current habitat within a given homerange. Changes in the effectiveness of the Centennial Range as a wildlife migration corridor remain speculative, but are unlikely since evidence suggests that Sheep Station activities have a minimal effect to wide ranging carnivore use of the habitat.	Carnivore use of the Centennial Mountain range would continue similar to the current condition, with additional potential for black bears and wolves to more fully utilize the current habitat within a given homerange. Changes in the effectiveness of the Centennial Range as a wildlife migration corridor remain speculative, but are unlikely since evidence suggests that Sheep Station activities have a minimal effect to wide ranging carnivore use of the habitat.	Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.	Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.

Table S2. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fish and Amphibians Details included in the Wildlife Report				
No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	Vacated stream crossings and watering areas would rehabilitate naturally. Downstream effects to fisheries and amphibian habitats from Sheep Station activities would remain negligible.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.
Infrastructure				
There would be no changes to the activities associated with the infrastructure.	The only activities that would continue would be: maintenance of roads to the headquarters area and the Mud Lake Feedlot; trucking between the Mud Lake Feedlot and Headquarters feedlot facility; and maintenance of the firebreak around the headquarters area.	Roads, fences, and firebreaks would continue to be maintained as necessary; sheep would continue to be transported to winter ranges and Mud Lake Feedlot by truck; sheep would continue to be trailed to Henninger and Snakey-Kelly;	Roads, fences, and firebreaks would continue to be maintained as necessary; sheep would continue to be transported to winter ranges and Mud Lake Feedlot by truck; sheep would continue to be trailed to Henninger, Snakey-Kelly, and West Summer; driveways in West Summer would continue to be used	Same as alternative 1, with the exception that trailing would only take place to Henninger and East and West Summer
Sheep				
There would be no change from the existing sheep herd (3,300 sheep)	35% of herd retained (1,155 sheep); 65% of sheep disposed of (2,145 sheep)	80% of herd retained (2,640 sheep); 20% of sheep disposed of (660 sheep)	There would be no change from the existing sheep herd (3,300 sheep)	70% of herd retained (2,310 sheep); 30% of sheep disposed of (990 sheep)

Table S2. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Soils				
Soils stable and productive except for low veg/soil state at Henninger. Maintains active noxious weed abatement program, though uses Krovar at feedlots. Maintains natural fire cycle at Headquarters.	Soils stable, possible increased leaf litter at Headquarters, Henninger, and Summer Range. Improved riparian soils on Beaver Creek willow tributary. Less potential weed dispersal from sheep, but less active weed control measures.	Soils stable, except continued low veg/soil state at Henninger. Improved riparian soils at Beaver Creek willow tributary. Possible increased leaf litter at Summer range. Maintains active noxious weed abatement program, though uses Krovar at feedlots. Maintains natural fire cycle at Headquarters.	Soils stable at Headquarters and Humphrey. Improved riparian soils at Beaver Creek willow tributary; Possible decreased plant vigor, litter production at Henninger and West Summer pasture. Decreased risk of invasive plants, though use of Krovar in feedlots; Maintains natural fire cycle at Headquarters.	Soils stable, possible increased leaf litter at Henninger and Summer Range. Decreased risk of invasive plants, though use of Krovar in feedlots. Maintains natural fire cycle at Headquarters.
Hydrology				
All proposed alternative would meet the intent of the Clean Water Act and the Executive Orders for wetlands and floodplains.				
No Change from present	No Change from present	No Change from present	No Change from present	No Change from present
Botany				
There would be no impacts to federally listed plant species from any alternatives proposed because no species occur and no habitat for federally listed plant species is present within Agricultural Research Service properties. All alternatives proposed within this environmental assessment would be in compliance with threatened and endangered plants according to the Endangered Species Act.				
Heritage				
Selection of any alternative would require Heritage review and compliance				
Socioeconomics				
No change in social or economic conditions	There would be no change in total amount of salary paid due to change in staff positions. Research scientist positions would replace technicians and herders not needed for operations under Alt 2 and 3.	There would be no change in total amount of salary paid due to change in staff positions. Research scientist positions would replace technicians and herders not needed for operations under Alt 2 and 3.	No change to employment and income conditions, and consequently no effect on household migration patterns and public services	No change to employment and income conditions, and consequently no effect on household migration patterns and public services
Environmental Justice				
No change in the current economic conditions, and would not have any impact on minority or low income populations	Total impact to environmental justice populations would be limited by the structure of Clark County's economy, but any local spending lost may have some adverse affect on low income populations	Total impact to environmental justice populations would be limited by the structure of Clark County's economy, but any local spending lost may have some adverse affect on low income populations	No change in the current economic conditions, and would not have any impact on minority or low income populations	No change in the current economic conditions, and would not have any impact on minority or low income populations

Dr Andrew Hammond is the Agricultural Research Service official responsible for deciding whether or not to select this action as proposed, or select one of the alternatives described above. The decision to be made by Dr. Hammond is whether to continue the historic and ongoing grazing and associated activities at the U.S. Sheep Experiment Station in Dubois, Idaho, in support of their mission or whether to modify these activities in any way.

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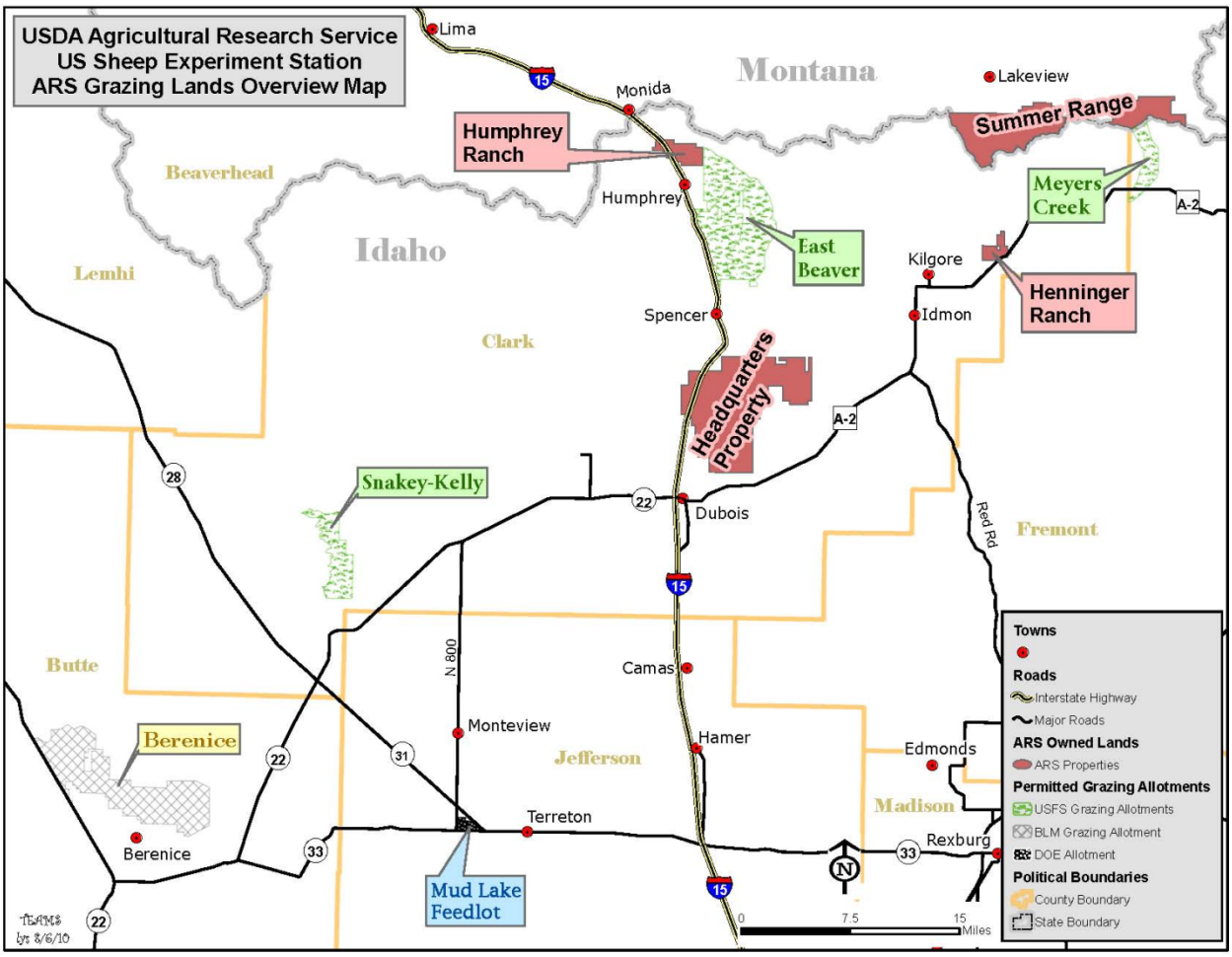

Figure 1. Vicinity Map

History of the Sheep Station at Dubois

In the fall of 1915, the Bureau of Animal Industry secured authorization to search for a tract of land in the west that could be used as a range for a western sheep breeding experiment station. Two exacting conditions governed the selection of the site:

1. The area must be unappropriated public domain land and not intermingled with homesteads or other property.
2. The location must be accessible by railroad.

The location at Dubois (Map 1), an area of approximately 28,000 acres, was decided upon, because it was the only location found containing a solid block of public domain land of sufficient acreage and adjacent to a railroad (McWhorter, V. The Pacific Wool Grower, Vol. 4. Nos.10 & 11, 1952).

The U.S. Sheep Experiment Station was established as a sheep breeding and rangeland grazing research facility. To provide the natural resource base for sheep and grazing research, lands were withdrawn from the public domain in 1915, 1916, 1919, and 1922. Presidents Woodrow Wilson and Warren G. Harding withdrew the lands with Executive Orders 2268, 2491, 3141, 3165, and 3767. Public Law 97-98-Dec. 22, 1981, clarified administrative jurisdiction of U.S. Sheep Experiment Station lands, which rests solely with the Secretary of Agriculture and the purpose of U.S. Sheep Experiment Station lands, which are

designated for "agricultural experiment purposes." There are no detailed records of land use prior to the U.S. Sheep Experiment Station establishment. Livestock grazing research under the Agricultural Research Service (ARS) ownership, which dates from circa 1918, predates the county. High elevation summer ranges were probably used for sheep grazing, a common practice at that time (possibly cattle but more likely sheep).

Between 1940 and 1942, the Humphrey and Henninger Ranches (Map 2) were purchased from the private sector. Prior to purchase, the Humphrey and Henninger Ranches were used for farming, some crop land, hay, mainly livestock production.

The Agricultural Research Service

The Agricultural Research Service was established on November 2, 1953, pursuant to authority vested in the Secretary of Agriculture by 5 U.S.C. 301 and Reorganization Plan No. 2 of 1953, and other authorities.

ARS is the principal in-house research agency of the U.S. Department of Agriculture (USDA). Congress first authorized federally supported agricultural research in the Organic Act of 1862, which established what is now the USDA. That statute directed the Commissioner of Agriculture "... To acquire and preserve in his Department all information he can obtain by means of books and correspondence, and by practical and scientific experiments...” The scope of USDA's agricultural research programs has been expanded and extended more than 60 times since the Department was created.

ARS research is authorized by the Department of Agriculture Organic Act of 1862 (7 U.S.C. 2201 note), Agricultural Research Act of 1935 (7 U.S.C. 427), Research and Marketing Act of 1946 (P.L. 79-733), as amended (7 U.S.C. 427, 1621 note), Food and Agriculture Act of 1977 (P.L. 95-113), as amended (7 U.S.C. 1281 note), Food Security Act of 1985 (P.L. 99-198) (7 U.S.C. 3101 note), Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624) (7 U.S.C. 1421 note), Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104-127), and Agricultural Research, Extension, and Education Reform Act of 1998 (P.L. 105-185). ARS derived most of its objectives from statutory language, specifically the “Purposes of Agricultural Research, Extension, and Education” set forth in Section 801 of FAIR.

The ARS mission is to conduct research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to: ensure high-quality, safe food, and other agricultural products; assess the nutritional needs of Americans; sustain a competitive agricultural economy; enhance the natural resource base and the environment; and provide economic opportunities for rural citizens, communities, and society as a whole.

ARS is committed to addressing the Department’s priorities:

- Assist rural communities to create prosperity so they are self-sustaining, repopulating, and economically thriving.
- Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while managing our water resources.
- Help America promote agricultural production and biotechnology exports as America works to increase food security.

- Ensure that all of America's children have access to safe, nutritious, and balanced meals (ARS 2011).

The Agency's research focuses on achieving the goals identified in the USDA and Research, Education, and Economics (REE) mission area Strategic Plans. The Government Performance and Results Act (GPRA) mandates each agency to establish general goals that will contribute to achieving beneficial societal outcomes that shape and drive the work of the Agency during the five years covered by the plan(2002, ARS).

Current Work

Current USSES research is aimed at developing new or improving existing genetic lines of sheep that specialize in paternal and maternal traits that enhance lamb production (i.e., number of lambs born and weaned per ewe), lamb growth, lamb carcass merit, and yield of marketable product; improving nutrient management throughout the sheep production cycle; developing monitoring technologies for landscape-scale assessment of plant communities and for determining the effects of rangeland management activities, including grazing and fire, on vegetation, ground cover, and herbivore selectivity; and developing science-based grazing and prescribed burn management strategies and decision support systems that can be used to guide managers to maintain or improve the ecological function of western rangelands.

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Chapter 1 – Purpose and Need

Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- *Chapter 1. Purpose of and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded. Finally this chapter describes the significant issues identified during scoping.

- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resources of most concern from public comments (range, wildlife, and connectivity) followed by the other resources analyzed.

- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

- *Index:* The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the draft specialist reports posted to the ARS website (http://www.ars.usda.gov/News/docs.htm?docid=17878) along with this DEIS.

Proposal Summary

This project is being proposed by the U.S. Department of Agriculture, Agricultural Research Service (ARS), U.S. Sheep Experiment Station (Sheep Station), Dubois, Idaho. The purpose of the proposed action is to achieve the research goals and objectives (to develop integrated methods for increasing production efficiency of sheep and simultaneously to improve the sustainability of rangeland ecosystems) of the Sheep Station described in the Purpose and Need section (page 15). To achieve those goals and objectives, we propose continuing historic (over 90 years) sheep grazing and associated activities currently occurring on ARS Sheep Station properties, U.S. Forest Service and Bureau of Land Management allotments, and a feedlot on Department of Energy land (proposed action) (All document maps are found in Appendix A – Project Maps).

Project History

On November 28, 2008, Dr. Andrew Hammond, Agricultural Research Service, Pacific West Area Director, signed the *Decision Notice for the Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project Environmental Assessment* (USDA 2008). This decision allowed us to continue historic and ongoing grazing operations through March 2010, the time estimated to prepare a longer term environmental assessment of our grazing and associated activities project.

On September 21, 2009, the Federal District Court in Missoula issued an order enjoining and vacating the delisting of the Greater Yellowstone Area grizzly population. In compliance with this order, the Yellowstone grizzly population is once again a threatened population under the Endangered Species Act (US District Court 2009). At the time of the relisting of the grizzly, we were in the process of preparing an environmental assessment for sheep grazing and associated activities that we carry out on ARS Sheep Station properties in Idaho and Montana.

Informal discussions between Sheep Station personnel and the USDI Fish and Wildlife Service, Idaho Falls, (January 2010) led to a decision that, because of the changed legal status of the Greater Yellowstone Area grizzly population, we would need to enter into formal consultation for the grizzly bear. As a result, we have stopped working on the draft environmental assessment and are instead preparing an environmental impact statement (EIS) to assess the effects of historic and ongoing grazing and associated activities at the Sheep Station.

To maintain our compliance with the National Environmental Policy Act during the preparation of the EIS, we issued a new interim decision (March 31, 2010) on sheep grazing based on the *Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project Environmental Assessment* (2008) as amended by the *Supplemental Information Report* (March 2010). The *Supplemental Information Report* contains analysis and data gathered during the preparation of the *U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009* draft environmental assessment which was issued for public comment December 14, 2009 – January 25, 2010. The new interim decision extended grazing activities through March 31, 2012. The new decision Notice and Supplemental Information Report as well as documents prepared for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009 can be viewed on the Agricultural Research Service, U.S. Sheep Experiment Station website - http://www.ars.usda.gov/News/docs.htm?docid=17878.

Cooperating Agencies

In addition to properties administered directly by the Agricultural Research Service Sheep Experiment Station, we also have written agreements in place to use lands administered by other federal agencies.

United States Department of Agriculture

U.S. Forest Service, Caribou-Targhee National Forest

Forest Service Agreement 07-IA-11041561-025 (2007): This agreement documents the coordination and authorization of the use of National Forest System land administered by the Caribou-Targhee National Forest by the U.S Sheep Experiment Station for research purposes. The intention is that “the research and investigation work shall be for the benefit of the entire sheep and range industry in Idaho and adjacent

states, and for the general benefit of the People of the United States.[1]" This document authorizes the Sheep Station to graze sheep at no cost on National Forest System land administered by the Dubois and Island Park Ranger districts as follows (Table 1, Map 2):

Table 1. Sheep grazing authorized on Forest Service System lands

Number	Class	Period	Allotment
933	Ewe/Lamb	07/03 – 09/06	Meyers Creek (Island Park Ranger District)[a]
1,210	Dry	06/16 – 09/15	East Beaver Creek (Dubois Ranger District)
1,200		11/06 – 01/02	Snakey Canyon (Dubois Ranger District)
1,000		11/20 – 01/03	Kelly Canyon (Dubois Ranger District)

a - Meyers Creek is unavailable for grazing while the Forest Service conducts formal consultation with the U.S. Fish and Wildlife Service

Forest Service Agreement 58-5364—6-142N (2006): The objectives of this cooperative project are 1) to determine the effects of the Continental Divide National Scenic Trail on ecosystem processes on ARS Sheep Station properties in the Centennial Mountains of Montana and Idaho and 2) to create a mechanism for completing the construction and accomplishing the maintenance of the trail through the Centennial Mountains.[2] The agreement coordinates trail condition and maintenance activities by the Forest Service on the portion of the trail on ARS Sheep Station properties (see Maps 4, 5, 8, 10, and Figure 2). The National Scenic Trails Act does not authorize the Agricultural Research Service to spend money on the Continental Divide National Scenic Trail, including signage. The Act authorizes the USDA Forest Service to construct and maintain the Trail across ARS Sheep Station properties and to provide signage. See pages 12 through 15 for additional information on the interagency agreement concerning the Continental Divide Trail.

United States Department of the Interior

Bureau of Land Management - 2007

Memorandum of Understanding Between USDI Bureau of Land Management, Upper Snake Field Office and the USDA Agricultural Research Service, U.S. Sheep Experiment Station (2007): The purpose of this MOU is to document, coordinate and authorize the use of public lands known as the Bernice Allotment, administered by the Bureau of Land Management, upper Snake Field Office for research purposes. Research is allowed for the mutually-desired purpose of managing the Bernice Allotment for scientific research while maintaining or improving the ecological condition of the native vegetative communities within the allotment. Research shall be conducted by the Sheep Station for the benefit of the entire sheep and range industry in Idaho and adjacent state, and for the general benefit of the People of the United States.[3] The MOU authorizes the Sheep Station to graze sheep at no cost on public lands within the Bernice Allotment, managed by the Upper Snake Field Office under the terms and conditions previously analyzed in Environmental Assessment #ID -70-00-010 as shown in Table 2 (see Map 2).

[1] USDA, Forest Service/Agricultural Research Service, USSES. July 2007. Forest Service Agreement 07-IA-11041561-025

[2] Forest Service/Agricultural Research Service. January 2006. Forest Service Agreement 58-5364-6-142N

[3] USDI, BLM/USDA, ARS, USSES. December 2007. Memorandum of Understanding Between USDI Bureau of Land Management, Upper Snake Field Office and the USDA Agricultural Research Service, U.S. Sheep Experiment Station

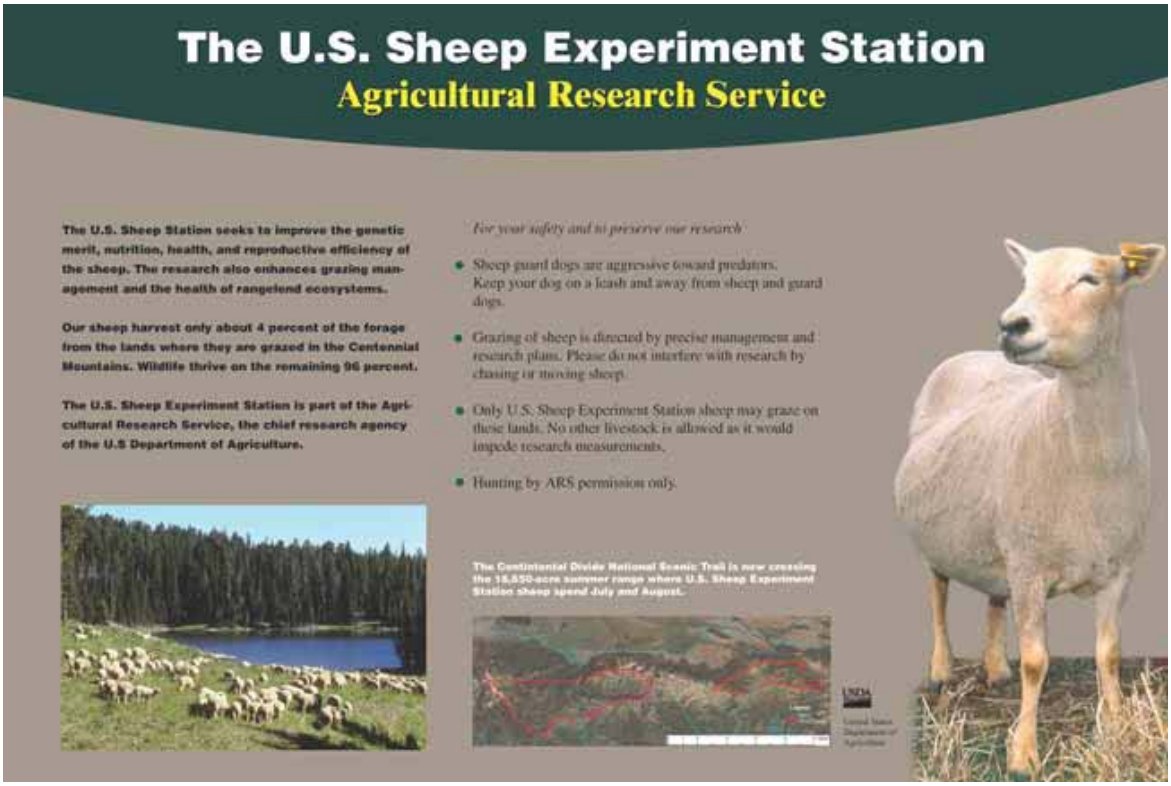

Figure 2. Sheep Station informational signs posted along the Continental Divide National Scenic Trail. (NOTE: Because of lack of funding, the Forest Service has not posted these signs along the CDNST.)

Table 2. Sheep grazing authorized on the Bernice Allotment

Livestock Number	1,050 Sheep	
Grazing Begin	11/23	12/06
Period End	02/01	02/05
Type Use	Active	
AUM [a]	490	428

a - AUM as expressed above is = amount of forage a 1,000 pound cow or equivalent would consume in one month, based on an average 26 pounds of dry forage per day. (From the Society of Range Management Glossary)

United States Department of Energy

Nuclear Regulatory Commission - 1963 (Previously the Atomic Energy Commission)

Atomic Energy Commission Contract No. AT(10-1)-1154 (1963): The purpose of this MOU is for the US Atomic Energy Commission represented by its Idaho Operations Office to grant a license to the USDA, ARS to allow the ARS to occupy, use and maintain a winter feeding area for experimental sheep

on its premises called the "Range" within the Commission's National Reactor Testing Station (see Map 2, 24).[4]

Project Location and Descriptions

The sheep research station is located in the upper Snake River plain at the foothills of the Centennial Mountains, approximately six miles north of Dubois, Idaho, which is the Clark County seat. Clark County contains 1,765 square miles of land and has a population of approximately 980 persons, approximately 500 of whom live in Dubois. Our operation is the second largest employer in Clark County (see Appendix A – Project Maps).

Figure 3. Headquarters Property

The Sheep Station has research property in two states (Map 2):

- 27,930 acres of ARS property at Headquarters, which has office, laboratory, animal, equipment, and residential buildings, dry-lot facilities for research throughout the year, lambing facilities, and lands used for spring and autumn grazing and rangeland research;
- Approximately 16,600 acres of [unsurveyed] Agricultural Research Service property in the Centennial Mountains of Montana, which is used for summer grazing and rangeland research;
- 2,600 acres of ARS property at the Humphrey Ranch in Idaho, which is near Monida, Montana, has animal facilities and equipment buildings, and is used for spring, summer, and autumn grazing and rangeland research; and

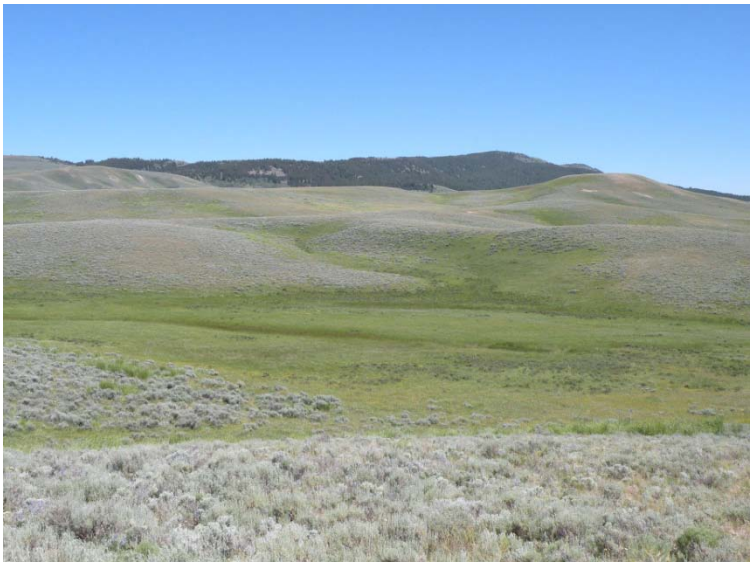

Figure 4. View of Lowlands, Humphrey Ranch

[4] DOE, AEC/USDA, ARS. February 1963. Memorandum of Understanding Between The United States Atomic Energy Commission and the United States Department of Agriculture, Agricultural research Service, Animal Husbandry Research Division

- 1,200 acres of ARS property at the Henninger Ranch near Kilgore, Idaho, which has animal facilities and is used for summer grazing and rangeland research.

The properties range in elevation from approximately 4,800 feet to nearly 10,000 feet, with average annual precipitation that ranges from approximately 10 inches in the Snake River plain greater than 21 inches in the Centennial Mountains. Because of its diverse geography, we have lands that contain subalpine meadow, foothill, sagebrush steppe, and desert shrubland ecosystems. This diversity provides unparalleled research opportunities within the Agricultural Research Service[5] (see Appendix A – Project Maps).

Figure 5. Vegetation and perennial stream Henninger Ranch

Properties (Agricultural Research Service-Owned Land Areas)

- Headquarters Property (Maps 1, 2, 12-17): 11N36E Sections: 1, 11, 12, 13, 14, 16, 22, 23, 24, 25, 26, 27, 34, 35, 36; Part of: 2, 9, 10, 15, 17, 20, 21, 28, 33. T11N37E Sections: 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19; Part of: 2, 3, 4, 11, 14, 20, 22, 23, 29, 30, 31. T10N36E Sections: 1, 2, 11, 12. T10NR37E Sections: Part of: 6, 7.

- Henninger Ranch (Maps 2, 19): T13N39E Sections: 25; Part of: 24, 36. T13N40E Sections: 19, 30.

- Humphrey Ranch (Maps 2, 20-21): T14NR36E Sections: Part of 19, 20, 21, 22, 27, 28, 29

- Summer Range - split into East Summer Range and West Summer Range (Maps 2-10, 22-23)

Grazing Areas (Subdivisions of the properties)

- Summer Range
  - East Range (Map 2-5, 22) (also referred to as Toms Creek Grazing Area): T14S1E: 34; Part of 25, 26, 27, 28, 32, 33, 35. T15S1E Sections: Part of 1, 2, 3, 4, 5, 6.

Figure 6. Odell Grazing Unit (West Summer Range) looking to the northeast

[5] http://www.ars.usda.gov/Main/site_main.htm?modecode=53-64-00-00 (01/05/08)

  - West Range (Maps 2, 6-10, 23) (broken into two units: West Odell Grazing Area and Big Mountain Grazing Area): T15SR2W Sections: 1, 2, 3, 4; Part of: 5, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23. T15SR1W Sections: 4, 5, 6, 7; Part of 8, 9, 10, 18, 19. T14SR1W Sections: Part of 31, 32, 33, 34

- Areas on Headquarters: Well Field and Crater Field

Figure 7. Views of uplands, Big Mountain Grazing Unit (Western Summer Range)

Figure 8. Views of Uplands in Toms Creek Grazing Area

Grazing Units

- Each grazing area has grazing units and these are numbered. Summer Range includes:
  - Odell Creek: 1 to 9 (Figure 6),
  - Big Mountain: 1 to 5 (Figure 7), and
  - Toms Creek: 1 to 11 (Figure 8).
  - There are three inaccessible areas on summer range that are not numbered and are not grazed because of timber cover and steep slopes.

- Headquarters Property includes Grazing Units (All Headquarters pastures are also grazing units):
  - Rim Rock
  - Northwest Tank
  - Bird Bath
  - Northeast Tank
  - Burning Bush
  - Well
  - Dipping Vat
  - Last Camp
  - Crater
  - Rocky Bluff
  - West Camp
  - Northwest Reservoir
  - Pole Line
  - Wagon Wheel
  - Rubber Tire
  - Enclosure
  - Bed Springs

Figure 9. Summer East Range - variety and amount of broad-leafed plants (cj 08/09)

Pastures

Pastures (Figure 9) are fenced areas on any of the properties used for grazing.

- Pastures can be as large as a Grazing Area (e.g., Well Field and Crater Field) or as small as a Grazing Unit (e.g., all grazed pastures south of the Crater Field on the Headquarters property).

- They are independent of Grazing Areas and Grazing Units. They don't necessarily follow the Grazing Area or Grazing Unit boundaries.

- HQ - Well Field (eastern most pasture divided into several grazing units) and Crater Field (just west of the Well Field is also subdivided into several grazing units). All other grazing units at HQ are pastures.

- West Summer Range has two pastures used for horse grazing.

Exclosures

Exclosures (Figure 10) are not pastures. Grazing is excluded from exclosures.

Figure 10. Exclosure fence, Summer West, Odell Unit (cj 08/09)

Non Agricultural Research Service Lands Adjacent/Within the Project Area

Other Areas Used by the Sheep Station

Throughout the year, sheep utilize Bureau of Land Management (Map 2), Forest Service (Map 2), and Department of Energy (Map 2, 24) lands (see Cooperating Agencies, page 6). These lands will be included in this analysis as appropriate. However, use of these allotments for the allowed AUMs and grazing inclusive dates is covered under separate agreements with those agencies and are covered by the appropriate National Environmental Policy Act documentation. Alternatives analyzed in this project are within the forage use decisions for the allotments.

Allotments or Grazing Allotments

- Bureau of Land Management grazed lands are allotments

- Forest Service grazed lands are allotments

Mud Lake Feedlot

Department of Energy land used by ARS is developed into a feedlot. It is referred to as Mud Lake Feedlot.

Agricultural Research Properties in Context of Adjacent Lands

ARS properties within the project area are not contiguous (Map 1-2). Other ownerships in the area of the Sheep Station include (Appendix A – Project Maps):

- Private
- State of Montana
- U. S. Department of the Interior:
  - Bureau of Land Management:
    - Dillon Field Office, Dillon, Montana (http://www.blm.gov/mt/st/en/fo/dillon_field_office.html)
    - Upper Snake field Office, Idaho Falls, Idaho (http://www.fws.gov/refuges/profiles/index.cfm?id=61570) (ARS not displayed on BLM district map. (http://www.blm.gov/id/st/en/fo/upper_snake.html)
  - U.S. Fish and Wildlife:
    - Red Rocks Lake National Wildlife Refuge (http://www.fws.gov/refuges/profiles/index.cfm?id=61570)
    - Map - http://www.fws.gov/redrocks/images/rrlmap.gif
- U.S. Department of Agriculture, Forest Service:
  - Caribou-Targhee National Forest (http://www.fs.fed.us/r4/caribou-targhee/): Dubois and Ashton Ranger Districts (http://www.fs.fed.us/r4/caribou-targhee/maps/ashton_ip_2006.pdf)
  - Beaverhead-Deerlodge National Forest (http://fs.usda.gov/bdnf)

Access to ARS properties is restricted, and public use is prohibited because there are potential adverse effects of public presence on research projects, lands, and infrastructure. The primary concern is disturbing the research herds and their guard dogs, which may be aggressive.

The Continental Divide National Scenic Trail, administered by the Caribou-Targhee National Forest, traverses small portions of the Summer East and West Ranges and essentially follows the southern border of both ranges. The National Scenic Trails Act does not authorize the Agricultural Research Service to spend money on the Continental Divide National Scenic Trail, including signs. The Act authorizes the Forest Service to construct and maintain the Trail across Agricultural Research Service properties and to provide signs. However, due to lack of funding, the Forest Service has not posted these signs.

Maps 1-10 display the location of ARS properties used by us for sheep research in Idaho and Montana.

Two outfitter guides have permits to guide parties on to the Agricultural Research Service properties in the Centennial Mountains in Montana.

The Headquarters property area is bordered by a patchwork of private, Idaho State, and Bureau of Land Management lands (see Map 12).

Henninger Ranch (Map 19) is bordered primarily by private lands to the west and state lands to the north, south, and east. The exception being small portions of Bureau of Land Management lands to the southeast and northwest.

Humphrey Ranch (Map 20) is bordered by private lands to the north, south, and west, and Caribou-Targhee National Forest System land to the east.

Both East and West Summer Ranges (Maps 3-10) are bordered by the National Forest system lands to the south, and west. Beaverhead-Deerlodge National Forest system lands are east of the East Summer Range. East and West Summer Ranges are bordered by Bureau of Land Management lands (BLM), Centennial Wilderness Study Area to the north. There is a partial section of Montana state lands directly north of the West Summer Range pastures. Beaverhead-Deerlodge National Forest, Red Rocks Lakes National Wildlife Area and Montana Fish Wildlife and Parks land are north of the Agricultural Research Service Summer Range.

The Continental Divide National Scenic Trail is located near the southern boundaries of the East and West Summer Ranges (Maps 4, 5, 8, 10). The Caribou-Targhee National Forest maintains the trail. Signs (page 8) along the trail are posted to notify hikers the "Continental Divide National Scenic Trail is now entering the 16,600-acre summer range where Sheep Station sheep spend July and August." These signs contain information about the U.S. Sheep Experiment Station, its mission, a map of Agricultural Research Service properties in relation to the trail, and warnings concerning sheep and the presence of guard dogs.

The Caribou-Targhee National Forest Summer Travel Maps (Dubois Ranger District: http://www.fs.fed.us/r4/caribou-targhee/mvum_maps/dubois_2009_52X34.pdf and the Ashton/Island Park Ranger District: http://www.fs.fed.us/r4/caribou-targhee/maps/ashton_ip_2006.pdf) maps clearly show ARS and other federal ownership land locations. Other agency and private maps may not delineate Agricultural Research Service properties.

There are also unofficial, user-defined trails in the area of the ARS properties in the Centennial Mountains that may show on some maps. Because of these mapping errors and lack of information concerning ARS property location in the Centennial Mountains, users may be unsure about whether they are on ARS properties or on other land ownerships. The following is an example of the lack of information about the Sheep Station and misinformation concerning the Continental Divide National Scenic Trail and its environs.

Access across the East Summer Range on the Continental Divide Trail is from Red Rock Pass to the northeast of the East Summer Range, south along Hell Roaring Creek to the Keg Springs Road on the Montana/Idaho border (Maps 4, 5). From the Keg Springs Road to the west, the trail is located along the Montana/Idaho border (the southern border of the East Summer Range).

The Continental Divide Trail Alliance website[6] states that along the Hell Roaring Creek portion of the Continental Divide Trail hikers may, "visit the Red Rock Lakes National Wildlife Refuge." This information is inaccurate. The Hell Roaring Creek section of the Continental Divide Trail is located along the eastern portion of the Summer East Range (Map 4). At the Trail's closest point, just east of the West Summer Range, the Continental Divide Trail is located about 1.3 air miles south of the south boundary of the Red Rock Lakes National Wildlife Refuge (see Maps 7-10).

The website goes on to state,

> If you want to spend part of the day at the Refuge and part of the day on the CDT, you can. There is a shorter day hike available within the longer 14 mile Centennial hike. Instead of going to Blair Lake follow the signs to Lillian Lake, crossing Hell Roaring Creek and gaining altitude as you venture into beautiful open meadows and forested groves. Cross a second

[6] (http://www.cdtrail.org/page.php?pname=trips/MTID/centennial)

segment of the Hell Roaring before Lillian Lake appears above you as you climb a little higher. Enjoy fishing in solitude as you picnic by the still waters. There is also a short hike off of CDT to Blair Lake from Keg Springs on the Idaho side. Take a spur route a half mile off the CDT to Blair Lake.

Note the location of Lillian Lake and Blair Lake on Map 4. Neither of these lakes is directly adjacent to the Continental Divide Trail. To reach these destinations hikers would have to leave the Continental Divide Trail. Public access to ARS properties is restricted because the unauthorized presence of hikers visiting or camping at these lakes could interfere with our research projects.

Purpose and Need for Action

The purpose and need for this project is to achieve the research goals and objectives to achieve the mission (to develop integrated methods for increasing production efficiency of sheep and simultaneously to improve the sustainability of rangeland ecosystems) of the Sheep Station.

Agricultural Research Service

The Agricultural Research Service is the intramural research agency for the U.S. Department of Agriculture (USDA), and is one of four agencies that make up the Research, Education, and Economics mission area of the department. The Agricultural Research Service budget is allocated to research conducted in 22 national program areas. Research is conducted in 108 laboratories by ~2,200 full-time scientists within a total workforce of ~8,000 Agricultural Research Service employees. Their job is finding solutions to agricultural problems that affect Americans every day, from field to table. ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to: ensure high-quality, safe food, and other agricultural products. Unlike the Forest Service or Bureau of Land Management, Agricultural Research Service is not a land management agency, and is not subject to the Federal Land Management Policy Act or the Forest Service Organic Act. The Agricultural Research Service is solely a research agency. As a research agency, Agricultural Research Service (in this instance, the Sheep Station) is not required to, nor does it manage its properties for multi-purpose public use.

Mission Statement, U.S. Sheep Experiment Station, Dubois, Idaho

The mission of the U.S. Sheep Experiment Station (Sheep Station), Dubois, Idaho is to develop integrated methods for increasing production efficiency of sheep and to simultaneously improve the sustainability of rangeland ecosystems.

To contribute to USDA, Agricultural Research Service, National Programs; and to accomplish the Agricultural Research Service mission at the U.S. Sheep Experiment Station, Agricultural Research Service scientists address problems defined in the National Program (NP) 101 and NP 215 (Formerly 205) Action Plans. Because of the connectivity among the National Programs and their components, a single experiment at the U.S. Sheep Experiment Station may contribute to multiple components of NP 101 and NP 215. This feature of the National Programs and U.S. Sheep Experiment Station programs will lead to an understanding of the interactions between sheep and the environments in which they are produced that can be used to improve sheep production systems and ensure the sustainability of grazing land ecosystems.

NP 101 Action Plan[7]:

Understanding, improving, and effectively using animal genetic and genomic resources; preserve and curate livestock and poultry genetic resources; develop and implement genome-enabled genetic improvement programs; enhancing animal adaptation, well-being and efficiency in diverse production systems; reducing reproductive losses; improving efficiency of nutrient utilization and conversion to animal products.

Component 1: Understanding, Improving, and Effectively Using Animal Genetic and Genomic Resources

Problem Statement 1B: Identify functional genes and their interactions.

Problem Statement 1D: Develop and implement genome-enabled genetic improvement programs.

Activities linked with this component: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement

Proposed activities linked with Component 1 affect the production environment of sheep. Genetic improvement programs are needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the U.S. Sheep Experiment Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Prescribed burning, seeding, and cattle and horse grazing are activities that influence availability of nutrients on western U.S. rangelands and, thus, the production environment of sheep. Predation influences grazing behavior and, thus, the amount of nutrients that sheep consume, retain, and excrete. Predator avoidance and (or) abatement, depending upon species, maintains safe and productive environments for research sheep. Understanding the effects of environmental conditions on gene function facilitates genetic improvement of sheep that graze western U. S. rangelands. Stakeholder acceptance of genetic improvement programs depends on these programs being tested in production environments similar to theirs.

Component 2: Enhancing Animal Adaptation, Well-Being and Efficiency in Diverse Production Systems

Problem Statement 2A: Enhance animal well-being and reduce stress in livestock and poultry production systems.

Problem Statement 2B: Reducing reproductive losses.

Problem Statement 2C: Improving efficiency of nutrient utilization and conversion to animal products.

Activities linked with this component: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management

Proposed activities linked with Component 1 affect sheep well-being. Management strategies are needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products (milk, meat, and fiber). Environmental stressors influence animal well-being. Stress is inversely related to adaptability; when sheep readily adapt to an environment, stress is low. Nutrient harvesting (grazing) and utilization (digestion and retention) are related to adaptability; sheep adapted to an environment, efficiently seek, find, and consume adequate

[7] http://www.ars.usda.gov/SP2UserFiles/Program/101/2007-2012ActionPlan/101ActionPlan2007-2012FINAL.pdf (08/28/09)

nutrients to support growth, health, and reproduction. Prescribed burning, seeding, and cattle and horse grazing are activities that influence availability of nutrients on western U.S. rangelands and, thus, the well-being of sheep. Excessive predator presence compromises the ability of sheep to adapt, which results in increased stress and reduced state of well-being. Predator avoidance and (or) abatement, depending upon species, maintains productive environments for grazing sheep. Understanding sheep adaptability to diverse environments facilitates development of management strategies that enhance the well-being of sheep that graze western U.S. rangelands. Stakeholder acceptance of sheep management strategies depends upon these strategies being tested in production environments similar to theirs.

Component 3: Measuring and Enhancing Product Quality

Problem Statement 3A: Developing systems for reducing variation in product quality and yield.

Activities linked with this component: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management

Proposed activities linked with Component 1 affect quality of products (milk, meat, and fiber) from sheep. Production systems are needed to improve quality and consistency of products from sheep that are grazing diverse rangeland environments of the western U.S. Environment influences expression of product-linked genes and state of well-being in grazing sheep. Prescribed burning, seeding, and cattle and horse grazing are activities that influence nutrient availability, which directly affects production efficiency and quality of sheep products. Excessive predator presence influences sheep well-being. Predator avoidance and (or) abatement, depending upon species, maintains productive environments where genetic improvements in product quality can be realized. Sheep grazing is a component of integrated pest management systems that are designed to control invasive plant species, such as leafy spurge, by conducting this activity we can determine the effects of systems that focus grazing on these invaded communities on product quality and yield. Understanding expression of product-linked genes in sheep grazing diverse environments facilitates development of production systems that result in high-quality, consistent sheep products for consumers. Stakeholder acceptance of sheep production systems depends upon these systems being tested in production environments similar to theirs.

NP 215 (Formerly 205) Action Plan[8]:

Develop and transfer economically viable and environmentally sustainable production and conservation practices, technologies, plant materials and integrated management strategies, based on fundamental knowledge of ecological processes, that conserve and enhance the Nation's diverse natural resources found on its range, pasture, and hay and turf lands.

NP215: Objective A.2

Ecosystems and their sustainable management; rangeland management systems to enhance the environment and economic viability; grazing management; livestock production and the environment; and integrated management of weeds and other pest's components.

Beneficiaries of the Program:

Many entities will benefit from this national program, which addresses such an important and pervasive natural resource base. It will benefit the Nation's livestock producers who utilize both harvested and grazed forages in their agricultural operations and the action agencies such as the Natural Resource Conservation Service and Cooperative Extension that provide technologies and knowledge to these

[8] http://www.ars.usda.gov/SP2UserFiles/Program/205/215ActionPlan_Jan07.pdf (08/28/09)

producers. This program also will benefit federal land stewardship agencies such as the Bureau of Land Management, Forest Service, National Park Service, Fish and Wildlife Service, Bureau of Indian Affairs, and U.S. Geological Survey (USGS), that are responsible for almost a billion acres of publicly owned lands. Beneficiaries include state land management agencies responsible for state-owned grazing lands and resource managers, policymakers, and both rural and urban community organizations that need information and technologies to evaluate and manage their rangeland resources. Finally, the public at large will benefit through improved management of the Nation's range, pasture, forage and turf lands through greater economic opportunities, access to high quality food, fiber and recreational opportunities, and enhanced environmental services.

Component 1: Rangeland Management Systems to Enhance the Environment and Economic Viability.

Problem Statement A: Need for economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems.

Problem Statement B: Need for improved livestock production systems for rangelands that provide and use forages in ways that are economically viable and enhance environmental sustainability.

Problem Statement C: Need for improved rangeland restoration, rehabilitation and mitigation practices, germplasm, tools and strategies to restore rangeland integrity in a manner that is economically feasible and environmentally acceptable.

Activities linked with this component: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management.

Proposed activities are linked with Component 1. These activities are necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Prescribed burning and integrated pest management (IPM) activities allow us to determine the effect of these management activities on environment and rangeland productivity. Effects of sheep grazing as an IPM component on sheep productivity are being evaluated, thus IPM and sheep grazing activities are required. Cattle and horse grazing are required to manage decadent forage, maintain range condition, and reduce the risk of fire on research lands. Seeding is required to evaluate restoration, rehabilitation, and mitigation activities to manage disturbed sites (e.g., road sides, firebreaks, historical borrow pits, and mines) that may be susceptible to weed invasion or erosion. Sheep grazing, prescribed burning, seeding, cattle and horse grazing, and IPM are components necessary to developing rangeland monitoring tools. Seeding, prescribed burning, and sheep grazing activities are needed to evaluate plant species that are developed for rangeland improvement programs. Predator avoidance and (or) abatement, depending upon species, is necessary to maintain sheep grazing density and duration at levels specified by research objectives.

Component 2: Pasture Management Systems to Improve Economic Viability and Enhance the Environment

Problem Statement D: Need for appropriate plant materials to improve the economic viability and enhance the environment in pasture-based livestock systems.

Problem Statement J: Need for economically viable, energy efficient and environmentally enhancing production systems for establishing, growing, maintaining, harvesting, treating, storing and transporting forages for livestock, bioenergy, bioproducts and conservation objectives.

Activities linked with this component: Sheep grazing, seeding, and integrated pest management.

The proposed activities are required to plant, establish, maintain, and evaluate forages, collected or developed by collaborating scientists, on improved pasture in a sheep grazing system.

Research at the Sheep Station, Dubois, Idaho

Since our research began, circa 1918, we are credited with developing three breeds of sheep (i.e., Columbia, Targhee, and Polypay) and have been making germplasm (i.e., breeding stock) available to sheep breeders in North America since the 1920s. Based on numbers of registrations, Columbia has been one of the 10 most popular breeds of sheep in the United States since 1965. Grazing and rangeland research at our sheep station has been ongoing since the 1930s, and our research has produced unmatched information on managing grazing on sagebrush steppe to preserve native ecosystems.

Our current research is aimed at:

- Studying infectious diseases of domestic sheep, including the prion disease scrapie, malignant catarrhal fever virus and *Anaplasma ovis*. Malignant catarrhal fever virus and *Anaplasma* species infections are found in wildlife and domestic animals. We are collaborating on research involving transmission of the respiratory pathogens, ovine progressive pneumonia virus (OPPV) and *Mannheimia haemolytica (Mh)*. Ovine progressive pneumonia virus is in the same genus as human immunodeficiency virus (HIV) and shares many of the same pathological properties with HIV.

- Developing new or improving existing genetic lines of sheep that specialize in paternal and maternal traits that enhance lamb production (i.e., number of lambs born and weaned per ewe), lamb growth, lamb carcass merit, and yield of marketable product;

- Improving nutrient management throughout the sheep production cycle;

- Developing monitoring technologies for landscape-scale assessment of plant communities and for determining the effects of rangeland management activities, including grazing and fire, on vegetation, ground cover, and herbivore selectivity; and

- Developing science-based grazing and prescribed burn management strategies and decision support systems that can be used to guide managers to maintain or improve the ecological function of western rangelands.

Our research involves at least 34 scientists at nine Agricultural Research Service locations in seven states and 10 universities in seven states, in addition to the scientists at the Sheep Station. Most of our research spans multiple years, and some of our long-term sheep genetics and rangeland research spans more than seven decades. In many cases, our sheep station has been the only location in North America with the land and animal resources to conduct the research, and it is the only location in North America able to establish direct linkages between new research and research conducted over the last 90 years, providing a clear understanding of the long-term consequences of various management strategies. Our research is published in peer-reviewed scientific journals, which are becoming more readily available to the general public as publishing companies develop open-access electronic archives, and is often rewritten for various trade magazines.

Our research has been used to:

- Train new scientists;

- Write textbooks to educate university students in animal and rangeland sciences;

- Develop outreach programs that benefit farmers, ranchers, small business owners, agribusiness corporations, and land managers;
- Develop or improve sheep breeds that increase the efficiency of food and fiber production; and
- Preserve or improve rangeland ecosystems.

We are known worldwide for our research and sheep breeds. Scientists, sheep producers, students, and industry personnel from throughout the United States and other countries visit, and many more contact, us each year to learn more about the research or ask for comments on various issues associated with sheep production and rangeland management.

See the section Current Work at the beginning of this EIS for some examples of the research that is being conducted at our Sheep Station.

The Sheep Station as a Research Facility

Our Sheep Experiment Station was set aside by congressional designation as a research facility. ARS is not a land management agency like the Forest Service and the Bureau of Land Management; and therefore is not governed by a land management plan.

The land management plans governing National Forest system lands and Bureau of Land Management lands include goals and objectives and standards and guidelines for managing the lands under their jurisdictions. These management plans generally include resource thresholds beyond which management may have adverse effects to resources.

In the case of our Sheep Experiment Station, there are Action Plans with stated objectives that govern our research goals. Research conducted at the sheep station can contribute to developing thresholds for land management planning purposes in other agencies. It should be noted that while our sheep station is not bound to thresholds of resource effects, we must adhere to federal laws such as the Clean Water Act and the Endangered Species Act.

Proposed Action

Operations

Our Sheep Station currently has approximately 3,000 mature sheep, plus attendant young sheep. Including mature ewes and lambs, lambing rates are approximately 170 percent, and weaning rates are approximately 145 percent. The total number of sheep soon after the end of the lambing period is approximately 6,500. The numbers of mature and young sheep retained vary according to our research needs. Sheep in excess of those needed for hypothesis-driven research are not retained. Our sheep harvest most of their feed through grazing. Sheep numbers are kept well below range carrying capacity to maintain favorable range conditions. Operations include traditional and on-going activities associated with sheep grazing research.

Figure 11 through Figure 13 display average annual sheep movement across the Sheep Station. Grazing dates are approximate depending on range readiness. Winter range allotments are grazed every year; however, some areas within the winter grazed allotments are rested one in three years.

There are small groups, up to 200 sheep, grazed at Headquarters from mid-October to early December for research purposes, while most sheep are at the Mud Lake facility. We may also graze horse and cattle at Headquarters, Humphrey and Henninger during this period.

Two out of every three years sheep graze East Summer Range and the Meyers Allotment. During the third year we rest these areas.

Sheep graze across the landscape on a seasonal basis. Sheep numbers used to determine animal unit months (AUMs) are based on a 10-year sheep inventory high of 3,331 head. Table 3 and Figure 11 through Figure 13 display grazing areas utilized by sheep throughout a typical season. Sheep numbers in Table 3 are rounded to 3,300. Dates on and off each grazing area are average dates to display possible variations from year to year depending on weather and forage conditions.

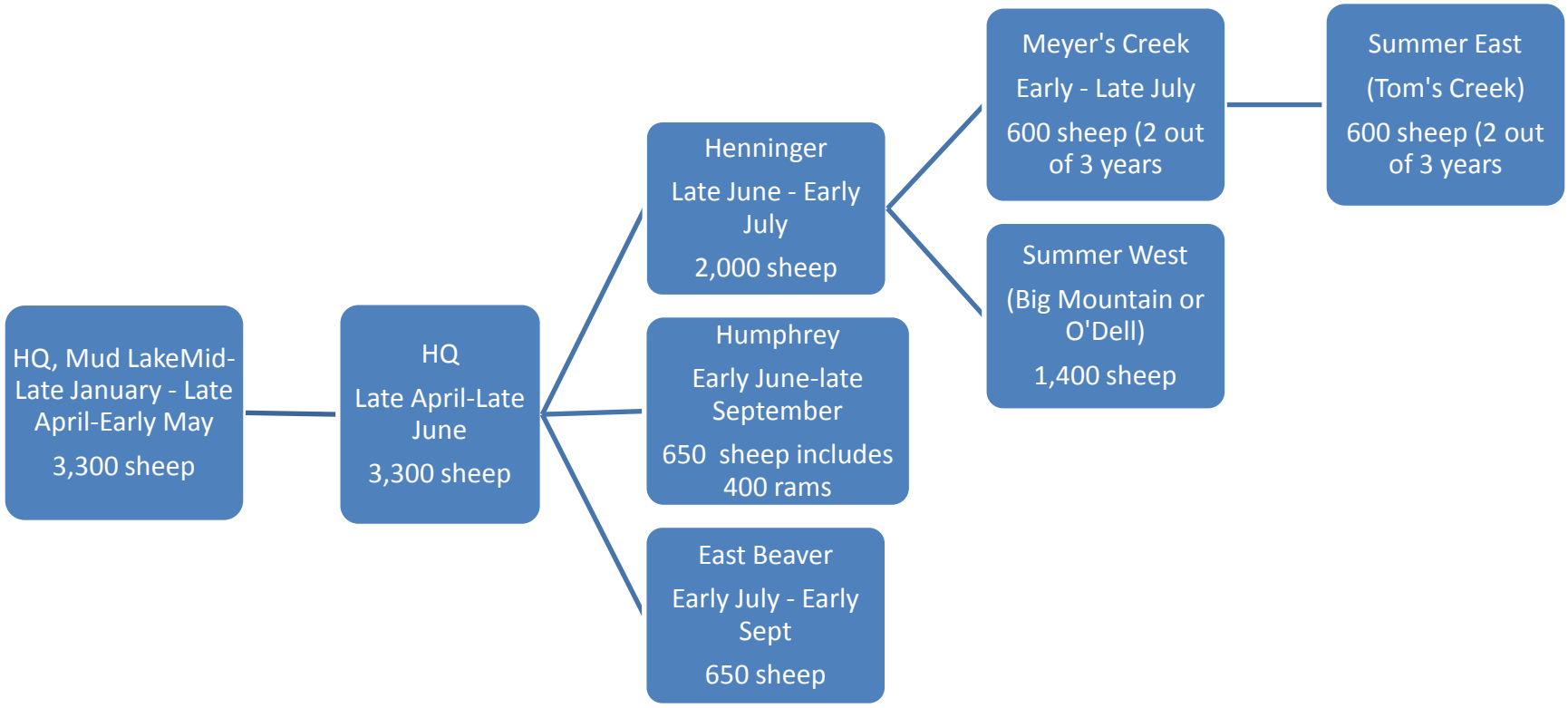

Figure 11. Proposed action sheep movement out to summer range

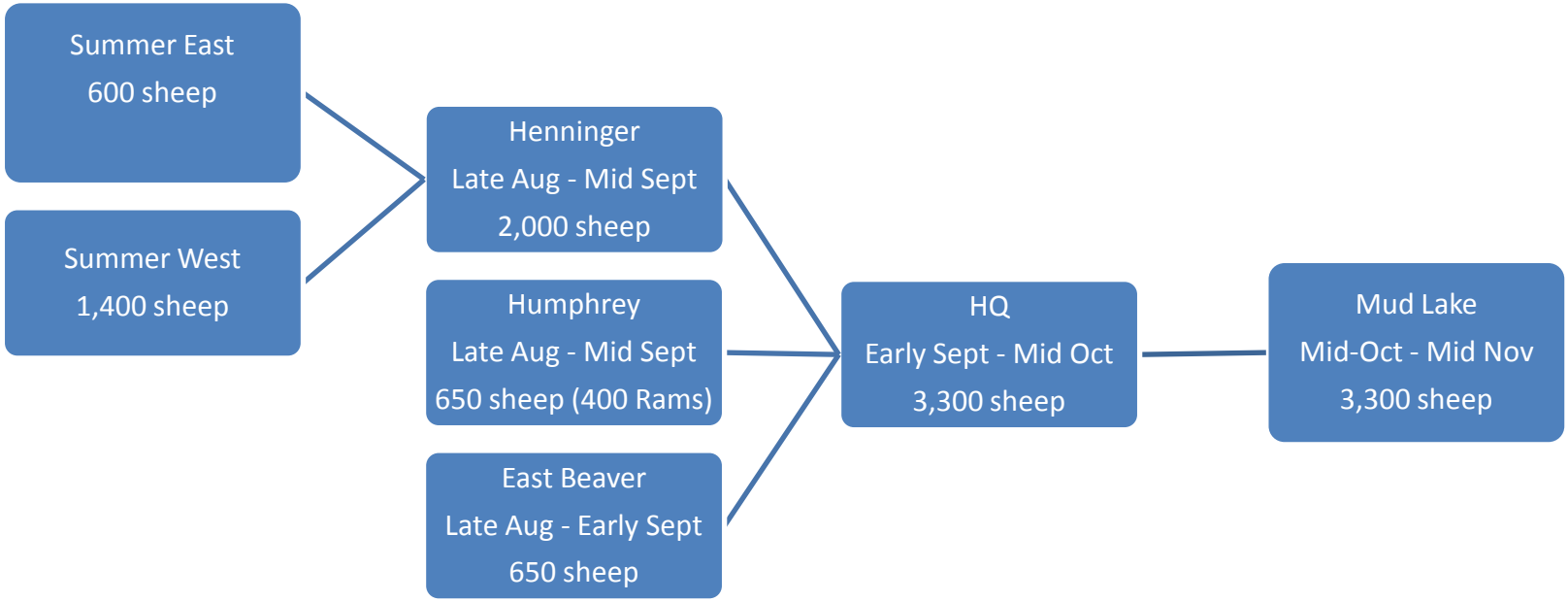

Figure 12. Proposed action sheep movement off summer ranges

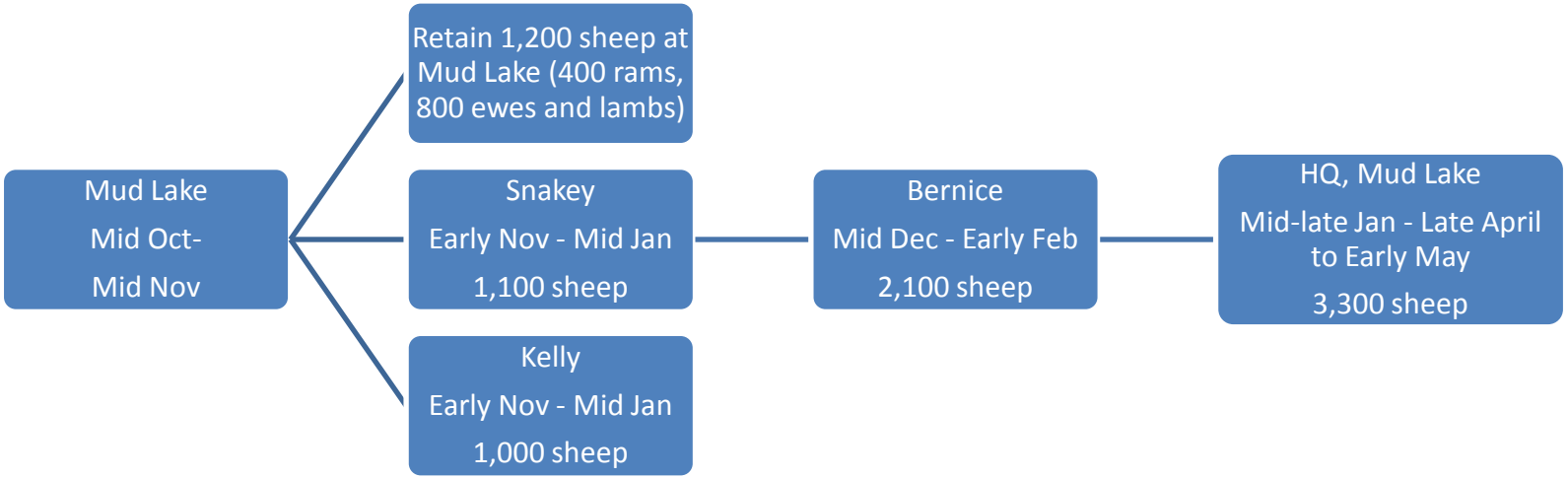

Figure 13. Proposed action sheep movement and grazing schedule during the winter period

Table 3 is based on calculations using the best available plant productivity estimates and the high from the last 10 years of sheep inventory data (Moffet 2009, personal communication) and demonstrates the expected distribution of AUM utilization (sheep only) for the past 10 years, present, and future. AUMs used are based on days shown in Table 3. Actual days when sheep would be on the range vary from year to year depending on weather and plant conditions. Average days and rounded sheep numbers, for a typical year, when sheep are moved on and off each range are shown in Table 3.

Table 3. Proposed action: Annual AUM[a] utilized per property within the approximate[b] dates that are specified. The calculations are based on 3,331 sheep[c] (Moffet 2009, personal communication).

Properties	AUM [a] Available	AUM [a] Utilized	Utilization Percent	Approximate [b] Grazing Dates
Agricultural Research Service Properties	**48,667**	**3,300**	**6.8 %**	
Headquarters	28,353	1,598	5.6 **%**	April 23 – June 25; September 1 – November 1
Humphrey	4,476	603	13.5 **%**	June 1 – October 20
Henninger	1,914	455	23.8 **%**	June 25 – July 9; August 31 – September 15
East Summer Range (Toms Creek)	4,043	155	3.8 **%**	July 23 – August 31
West Summer Range (Odell Creek/ Big Mountain)	9,881	500	5.1 **%**	July 9 – August 31
Allotments on Lands Managed by Other Federally Agencies (DOE, USDA- Forest Service, DOI-Bureau of Land Management)	**26,087**	**1,516**	**5.8 %**	
Mud Lake	560	160	28.6 **%**	Mid January – Mid April Mid October – Mid November
Snakey-Kelly	1,756	421	24.0 **%**	November 8 – December 15
East Beaver	17,877	213	1.2 **%**	July 3 – September 1
Meyers Creek	3,076	71	2.3 **%**	July 5 – July 23
Bernice	2,808	650	23.2 **%**	December 15 – February 5

a- Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheepc are equivalent to one (1) AUM.
b - Depending on climatic conditions and day of the work week these dates may shift ± 7 days.
c - A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s). Sheep numbers are rounded in the flow charts, for more specific sheep numbers see spreadsheets in the Rangeland Report Appendix B.

Forage used by sheep grazing is well below total available forage. Surveys indicate summer range forage use is very low, averaging 4.5 percent, with 95.5 percent available for elk, deer, moose and other wildlife food and cover. Unused forage provides soil and water protection.

Headquarters is grazed in spring and early summer, and in late summer and early fall each year at a total rate of 0.06 AUM per acre. Humphrey and Henninger are usually grazed in early summer and fall each year. The meadow pastures are grazed heavier than sagebrush vegetation types, since they are more productive, but overall, sheep are grazed on these ranches at a rate of 0.23 and 0.33 AUM per acre, respectively.

Sheep Trail and Driveway Use and Maintenance

Trails and driveways are used to move sheep between grazing areas.

Trails

Sheep are trailed along existing roads to move sheep from Headquarters and Henninger properties to other grazing areas. Table 4 displays the sheep trails used by Sheep Station personnel annually to move sheep (Map 11).

Table 4. Annual sheep trails

Trail	Description
Headquarters to Henninger	Trailing from Headquarters to Henninger follows a private unnamed two-track road part way with 90 percent of trailing on county roads (Spencer-Idmon and County Road A2)
From Henninger to Meyers	Sheep are trailed on County Road A2, sheep are moved or trailed while grazing through, Meyers Allotment to the East Summer Range
From Henninger to West Summer Range	Sheep are trailed on County road A2, and National Forest East Dry Road 327
When returning from East Summer Range to Henninger:	Sheep are trailed on Keg Springs National Forest Road 042 and County Road A2
When returning from West Summer Range to Henninger	Sheep follow National Forest Road 327 and County Road A2
When returning from Henninger to Headquarters	Sheep are trailed on County Road A2, Spencer-Idmon Road, and the unnamed two-track road on private land
Sheep are trucked to Humphrey and East Beaver Forest Service Allotment	At Humphrey, sheep are trailed through a gate to the adjacent National Forest East Beaver allotment.
Sheep are trucked and unloaded on National Forest Road 202.	Depending on snow depth, sheep are trailed along National Forest Roads 184, 279 and 202 to Snakey-Kelly National Forest Allotment. A temporary corral and mobile loading chute are set up on Road 202 for loading when sheep are moved off the Snakey-Kelly Allotment.

Driveways[9]

Sheep are moved along driveways (Figure 14) through timbered areas on East and West Summer Ranges. Herders on horseback use working dogs (Figure 2) to herd sheep from one grazing location to another. There are about four miles of maintained sheep driveways through timbered areas on the West and East Summer Ranges. Sheep driveway locations are shown on Maps 22 and 23.

[9] Driveway: Travel route used to move sheep from one grazing location to another in the summer ranges.

Driveways are through timbered areas in West Summer Range (Odell/Big Mountain) and East Summer Range (Toms Creek). Annual driveway maintenance is done through the timbered areas. Small diameter downed wood across driveways is retained on site; some limbing may be done on retained downed trees. Any new or recently fallen trees (greater than 10 or 12 inches in diameter) are cut out and removed (pulled back into adjacent timber stands) from the driveways each year. Occasionally sheep driveway trails are rerouted, closed, and rehabilitated. Driveways may be rerouted when a better route is located or an alternate route is needed for research. Driveways through timber patches and across meadows are short, generally less than one half mile long. If adverse effects to soil or water occur, mitigation measures (cross drains with woody debris to divert overland flow) are implemented or a driveway segment maybe rerouted to avoid sensitive areas. Unneeded or unused old driveways are closed and rehabilitated; seeded with native species, brush or woody debris if available is returned to the site, and animals are kept off to restore the area.

Figure 14. Sheep Driveway, Odell Creek (point OD5 on field map – jf 08/07/08)

Table 5. Sheep numbers trailed on pastures as an average of last five years

Unit	Length (approx. miles)	Use Time (approx. hr)	Horse	Ewes	Lambs
West Summer Range					
Skyline Unit - used twice a year	1	2	2	785	1,165
Odell Unit 6 - usually used once a year	0.13	1	2	785	1,165
Odell Unit 4 - usually used twice a year	0.13	0.5	1	785	1,165
Little Odell - used once a year	0.25	1	1	785	1,165
Big Odell -- used once a year	0.25	1	1	785	1,165
Big Mountain - generally used only once a year	0.25	1.5	2	782	1,157
Corrals to Top - usually used 4 times a year	0.5	1.5	2	782	1,157
Canyon Unit – used once or twice a year	1.4	0.8	2	782	1,157
East Summer Range					
Toms Units 5 & 6 – used once or twice a year	0.5	1.5	1	838	1,273
Toms Units 6 & 7 - used once or less a year	0.5	2	1	838	1,273

At three to four week intervals, sheep are moved from grazing areas to staging areas for data collection. On these drives, sheep are spread out over larger areas in open terrain and moved slowly while grazing to reduce adverse effects on the travel routes.

Driveways are used only on years the pastures in the area are grazed, which is two out of three years. Each pasture is rested one year in three.

Stock Water Operations

In areas where water is not readily accessible at Headquarters, water is trucked to the sheep and unloaded into water troughs 12 feet long, 12 inches high, and 12 inches wide. Troughs are moved as grazing progresses across the pastures. The number of troughs used at each grazing area depends on the volume of water needed to meet the daily water requirements of the sheep - for example, up to 35 troughs may be used for large bands, and two troughs are usually adequate where 50-60 sheep are grazed. There are 70 pastures at low elevation where water is trucked; about 80 watering sites are used. Each band has one watering site at a time. To reduce hoof action around watering sites, the watering sites are used for three to seven days and then moved, even if the sheep are not moved to a different pasture. Six to eight groups graze at the same time so that six to eight sites would be in use at any given time. Areas up to ¼ acre in size are disturbed from sheep use around water troughs, and tend to have crested wheatgrass cover. Henninger and Humphrey pastures have surface water available for watering sheep. Summer Ranges have surface water available for sheep and horses with developed sites on Big Mountain pasture described below.

Water Developments

Humphrey and Henninger

Irrigation was in place and ongoing before the ARS purchased the properties. Humphrey and Henninger Ranches have constructed ditches (Figure 15) to divert water onto grazing pastures while sheep are grazing the areas. Flood irrigation water is used to water sheep. Irrigation ditches and flood irrigated areas are located on Humphrey and Henninger pastures (Maps 19, 20).

Figure 15. Henninger ditch maintenance (jf)

Irrigation was in place and ongoing before the ARS purchased the properties. Creek water is diverted with canvas dams into ditches to flood pastures at the time sheep graze in the area; from Modoc Creek at Humphrey, and from West Dry Creek at Henninger. Diverted irrigation water may be used annually. Acres watered for each ranch varies, depending on stream flow at time of use. In dry years, very little water is used. Diverted water is used for watering sheep, while irrigation provides more green forage longer during the dry season. The number of days water is applied varies from one year to the next depending on needs and water availability. When sheep are moved out of the pasture, the canvas dams are removed, and the diversion is shut off. There are about two miles of irrigation ditch at each ranch. Humphrey pastures are grazed from May to October. Henninger ranch has water use rights from May 1 to October 31. Spring water use is prohibited until the water flow in Dry Creek no longer reaches Spring Creek in mid- to late June. Diversion ditches are inspected and maintained annually.

West Summer Range

There are five water developments, in the West Summer Range in Montana on the Big Mountain area. Springs are developed with permanent troughs to collect water in low-flow areas needed to water 350 to 900 ewes and 1,250 to 1,400 lambs at one time (Figure 16). Water developments are also used by wildlife.

Figure 16. Upland water trough (jf – 07/160/8)

The five water development sites on the West Summer Range include four metal and one rubber trough. Four of the developments are flume type with metal troughs and metal (3) or wood (1) support structures. Flumes are 80 to 90 feet in length, approximately 20 to 24 inches in width, and 14 to 16 inches deep. The fifth development is a series of round rubber troughs, with about 10 gallons capacity each, installed at springs.

Developed water site locations include:

- Short Canyon = SENE 1/4 Section 6, T15S, T1W (Round rubber troughs).
- Lower Unit 3 = SENE Section 5, T15S, R1W (Flume trough).
- Unit 2 = SWNWNW Section 5, T15S, R1W (Flume trough).
- Upper Unit 3 = SESW Section 33, T14S, R1W (Flume trough).
- Unit 4 = NENESE Section 4, T15S, R1W (Flume trough).

Schedule of proposed water development activities though 2014

Humphrey Ranch

- Continue cleaning the existing ditches with the ditching tool.
- Install two new weir boxes into Modoc Creek for better water measurement.

Henninger Ranch

- Continue cleaning the existing ditches with the ditching tool.
- Install new concrete diversion head gate on the National Forest System ground (once approved by U.S. Forest Service) - This would allow better measurement of the water usage and protect the ditch from erosion.

Summer Range

- Replace two existing wooden water developments with metal developments.
- Continue annual spring (water) cleanings for water sources.

Camp Tending

Sheep Herding Camps

Headquarters, Humphrey and Henninger Camps

Headquarters, Humphrey and Henninger are administered from existing roads. Herder camps on low elevation spring, fall and winter pastures are equipped with a 12-foot long by 7-foot wide, four-wheel living quarters trailer (Figure 17) and a tow-behind camp commissary to transport dog food, oats, saddles, and other gear. These camps are located near existing roads and are moved with pickups as sheep graze through the pastures. Camp activities affect ¼ acre or less at each site. Camp site equipment and activities include a horse trough, a horse picketed on a 20 to 30 foot chain, and dog feeding area. Camps at Headquarters, Humphrey and Henninger are visited by a camp tender at two day intervals. Crested wheatgrass provides the primary ground cover at the ¼ acre or less camp sites where camp activities remove or trample sagebrush and other vegetation. Total area affected by camp sites is a very small or negligible percentage of the total pasture area. Trash from herders' camps is transported back to Headquarters for proper disposal in a dumpster that is emptied at a legal landfill.

Figure 17. Camp herder trailer (sw 05/08)

Summer Range Camps

Summer camps include a seven foot by seven foot teepee tent, with no trough. Horses are watered at natural water sites or developments where sheep are watered, one horse is picketed, and one horse is loose. Camp areas affect about a 50-foot radius area, less than ¼ acre. Camps are moved every three to four days to progress with sheep grazing. Camps follow the sheep closely and, with frequent moves, have little effect on vegetation at the sites. Trash from herders' camps is transported back to Headquarters for proper disposal in a dumpster that is emptied at a legal landfill. Table 6 shows the number of camps in each Summer Range and season of use.

Table 6. Camps per pasture and season used

Range	Pasture	Camps per Pasture	Season Used
West Summer Range	Odell	9	July 10 – August 29
	Big Mountain	7	
East Summer Range	Toms Creek	6	

Maintenance and repair of existing permanent fence

Fences

There are about 180 miles of permanent sheep fence on Headquarters, Humphrey, and Henninger ranches. All fences are inspected and repaired annually. Fence locations, including exclosures, are shown on each pasture area. Fence types are shown and described in the map legend. Fences are constructed with three feet or four feet high woven wire and one or two barbed wire strands above the woven wire.

Pasture Fences

Sheep-proof fences at Headquarters, Humphrey, and Henninger are maintained to confine sheep. An eight foot high coyote-proof fence is maintained at Headquarters (Figure 18) around, and subdividing, section 2, T10N, R36E. The eight-foot-high fence was constructed circa 1976 for coyote-sheep interaction research; the research project ended circa 1987, and the fence is maintained to provide a safe location for certain ewe-lamb studies.

Figure 18. Example of coyote-proof fencing on Headquarters (sw 05/08)

Horse Corral

The horse corral fence on West Summer Range (Odell) pasture was constructed and is maintained to confine horses used for sheep trailing, camp tending and other sheep grazing management and research activities (See Map 23). The north and west part of the horse corral is sheep-proof net-wire with two strands of barbed wire above the net-wire. The south and east portion of the corral is two-strand barbed wire. All of the corral fencing on Odell pasture is let-down type. The drop fence is let down each year after grazing operations are complete.

Exclosures

Exclosures at Headquarters are sheep-proof fence, maintained to keep sheep from grazing excluded areas. The West Summer Range exclosures are drop fences, put up to exclude sheep when pastures in the exclosure areas are grazed. These drop fences are let down after sheep are removed from the pasture.

An eight-foot-high wildlife exclosure fence in section 7, T15N, R1W, West Summer Range, is maintained to exclude wild ungulates and sheep. An adjacent four-foot-high sheep proof exclosure is maintained to compare grazing effects. This wildlife and sheep exclosure includes a riparian area. These exclosures are located and designed to compare and evaluate domestic and wild ungulate grazing effects on willow and other riparian vegetation. The entire fenced area is less than 1/2 acre.

Schedule of proposed fence maintenance activities though 2014

Headquarters

- Replace four miles of existing fence with new fence materials - approximately four miles, with three-foot woven wire with one or two barbed wires above the woven wire, 3½ to 4-feet high - the routine work that must be done to keep fences safe and fully functional.
- Clean up nonfunctional research pens.
- Continue repairs on existing enclosures -new posts, wire on Headquarters.

Humphrey

- Replace three miles of existing fence with new fence (same location).
- Continue clean-up of old nonfunctional fence materials and any old equipment, such as feed troughs, that is found.

Henninger

- Replace two miles of existing border fence with new fence, metal braces, etc.

Summer Range

- Replace two miles of old horse pasture fence with new fence, metal braces, etc.
- Remove old range exclosures.
- Continue repairs on existing enclosures on West Summer Range - new posts and wire - the routine work that must be done to keep fences safe and fully functional.

Maintenance and repair of existing roads and fire breaks

Roads (Figure 19 and Figure 20)

Figure 19. Headquarters property displaying the firebreak and associated roads – See map 13 appendix A

Figure 20 Example of road on Headquarters (sw 05/08)

There are 142 miles of road on Headquarters property, two miles are paved, 21 miles of main road are one-lane gravel surfaced and 119 miles are one lane, native surface secondary roads. Most secondary roads are two-track with grass, forbs and low shrubs between tracks. Henninger ranch has about 1.5 miles of low use secondary roads with grass, forbs, and low shrub vegetation between the two tracks. There are about 2.7 miles of road on Humphrey property. West Summer Range has 0.8 miles of low use two track road for access to the horse corrals. About 7.8 miles of road were constructed on ARS summer range in 1950s to access the now closed mine in the north part of West Summer Range. This entire road has been closed, culverts pulled, fill in draw crossing excavated and drainage features restored. The road bed has grass, forb, shrub vegetation cover and is now used as a trail. About one mile of primitive two-track road to Blair Lake on East Summer Range has been closed to motorized use, cross drains have been constructed and compacted surface areas have been scarified. Additional reclamation work is scheduled for parts of this old road bed. Local roads on Headquarters, Humphrey and Henninger are gated. Public motorized travel is restricted. No new road construction is planned. Figure 20 shows a typical Headquarters roads.

Annual road maintenance is done on main roads as needed. Road segments with ruts or other maintenance needs are bladed or improved for efficient motorized travel. Road maintenance includes ongoing upkeep necessary to retain or restore the road to approved management objectives. Maintenance activities could involve cross drain construction or surface drain installation, spot surfacing, minor culvert installation and replacement, catch basin reshaping, road side brushing, and surface grading. The intent is to maintain existing road features and bring the road into compliance with best management practice standards. Each year approximately 20 miles of road need maintenance. Road maintenance is contained within the road right-of-way. Annual road maintenance is done on main roads as needed. Road segments with ruts or other maintenance needs are bladed or improved for efficient motorized travel. Each year approximately 20 miles of road need maintenance improvements. Road maintenance is contained within the existing road right-of-way.

Schedule of proposed road work activities though 2014

Headquarters

- Annual road maintenance (pulling up the shoulders and smoothing out potholes). All replacement gravel is hauled in from State of Idaho gravel pits.
- Remove, clean, repair and reinstall six existing cattle guards.
- Replace two existing culverts in the feedlot. Culverts are for runoff water in the spring, these two culverts are at the sheep pens and are not part of the road system.

Henninger

- Continue to lightly grade existing roads (no new road construction is planned).

Firebreaks

Figure 21. Cleared firebreak –fy 2008

The firebreak around the headquarters area is maintained annually with a motor grader to provide a mineral soil break about 20 feet wide. Chemicals may be used to control noxious weeds on the Headquarters firebreak. Weed management is described in the pest control section below. Firebreaks 15 to 20 feet wide down to mineral soil are constructed around prescribed burn areas including blackline burn areas. The firebreak around the Headquarters property is approximately 30 feet wide, 14,000 feet long and 10 acres in total area.

Prescribed burn firebreaks are constructed with a dozer and motor grader. Unit firebreak lines (Figure 8) and blackline firebreaks (Figure 9) are generally within 50 to 200 feet of each other. The firebreak on an average 75 acre burn area would affect about 1.2 acres. Cleared firebreaks around burn units are also used for vehicle and equipment access during burn operations and for research during and after the areas are burned. Shrub and grass debris removed from fuelbreaks is pulled back and spread over the cleared area on firebreaks not needed for research access after the burn, generally within the same season.

Figure 22. Blackline – fy 2008

Fire breaks around prescribed burn areas are not maintained. They are not seeded and revegetate with native species within one or two seasons. Fire breaks not needed for motorized access for research are rehabilitated. Wind-rowed shrubs, grass, litter, and top soil are pulled back and spread over the firebreak with a motor grader. Invasive, noxious weeds have not been a problem on the cleared firebreaks. *Bromus tectorum L*. (cheatgrass), present since 1930s is an incidental species on the Headquarters firebreak cleared area but is not persistent at this elevation or in this environment.

Range Improvement (NP215, Objective A.2)

Prescribed Burning

The overall plan is to burn Headquarters pasture areas about every 30 years, this could equal prescribed burning of approximately 900 acres each year. Actual burned area over the past 30 years, 13,867 acres, has been less than the planned average 900 acres per year. Burning, for research to improve forage production, provides wildlife habitat and other resources as secondary benefits. All burning completed in 2008 and spring 2009, was located on areas that had been previously prescribe burned. Total burn area for fall 2008 and spring 2009 was 474 acres. Burn unit locations are shown on Agricultural Research Service-Headquarters Prescribed Fire History Maps 14 and 16.

An 11,800 acre landscape area has been identified for future burn opportunities, about 2,000 acres within the identified area would be burned in the next five years (2015), an average 400 acres/year. Agricultural

Research Service-Headquarters Prescribed Fire History Map 8, identifies the area where burning would be done. Specific locations for each burn unit would depend on research needs. Burn units are unlikely to have complete combustion; therefore there would be unburned areas within the burn unit perimeter. Prior to burning an individual burn plan would be prepared (see example in Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project Environmental Assessment, Rangeland Specialist Report Appendix: Statement of Work – Prescribed Burns – Dubois, Idaho (2008).

Seeding

The following seeding activities are proposed for the Headquarters and Humphrey properties within the next five years (Maps 18 and 21):

- Revegetate historic gravel pit in Pasture 4U/1U - 2011 - Entire area (~52 acres) would be seeded to a mix of antelope bitterbrush (*Purshia tridentata),* forage kochia (*Kochia prostrata* (L.) Schrad), and crested wheatgrass (*Agropyron cristatum)* to rehabilitate the site.

- Revegetation after fire in pastures 6, 7, and 8 - 2014 - A portion of the burned area (~120 acres) would be seed to different varieties of forage kochia (*Kochia prostrata* (L.) Schrad) in collaboration with another ARS research unit to evaluate the varieties under high-elevation, sagebrush-steppe conditions.

- Various forage kochia varieties are planned for planting on 240 acres in 2014 to accomplish research objectives

- Eight (8) acres are planned for seeding at Humphrey in 2010 and nine acres are planned for 2011 to accomplish research objectives.

Cattle and Horse Grazing

Cattle and horse grazing with cooperative research is used periodically to improve sheep range conditions. Cattle and horses consume vegetation that sheep typically do not harvest, create more uniform pastures for grazing research, reduce residual on-site forage for other rangeland research, and reduce fuel loads and fire risk. Cattle and horse grazing is used mainly on the Headquarters range, with less frequent cattle grazing on Humphrey and Henninger ranches. The number of animals used varies from year to year depending on research needs and vegetation conditions. Cattle or horse numbers, (AUMs used) are based on the area (acres) and amount of dormant forage needed to be removed. Excess forage removed is fine fuels, standing dead plants, primarily grasses. Sheep Station goals for removing excess forage is to reduce the fine-fuel load to reduce wildfire risk and to remove standing dead plants to make new growth more accessible to livestock. Cattle and horse grazing commences in late fall or early winter after forage growth has ceased for the year and when plants are dormant. Cattle and horse grazing is not done during the growing season. Cattle and horses are grazed generally between November 1 and January 1, in years when cattle or horse grazing is used (Lewis 2011, personal communication). Some pastures are grazed longer than 30 days and some years grazing could start in October and end about January 10.

No cattle were grazed in 2006 due to drought conditions. Cattle are primarily used with limited horse grazing. Pastures are evaluated for forage removal needs and mapped to determine livestock stocking. Grazing bids are solicited and awarded to private livestock owners. Number of animals, number of days, and areas grazed are tracked with detailed yearly records at the Dubois Sheep Experiment Station. Table 7 displays average AUMs from 1997 to 2008 for each property (Moffet 2009, personal communication).

Table 7. Average cattle and horse AUMs used from 1997 to 2008

Attribute	Cattle and Horse AUMs Used by Property			Total
	Headquarters	Humphrey	Henninger	
Mean	2106.0	848.7	6.6	2962
Minimum	0.0	0.0	0.0	0.0
Maximum	4560.9	1697.7	48.5	6307
Median	1766.7	1063.6	0.0	-

Headquarters is divided into six pastures and Humphrey into eleven pastures for grazing, cattle or horses are not grazed every year. Grazing pastures vary from 160 to about 9,000 acres (Crater Field) (Williams 2008, personal communication). Pasture size, number of animals grazed and number of days grazed by year on each pasture are included in Appendix B. Table 8 displays cattle and horse AUMs used from 1997 to 2010 for Headquarters property, Humphrey and Henninger ranches.

Table 8. Cattle and horse AUMs used by property from 1997 to 2010

Year Grazed	Cattle and Horse AUMs Used by Property		
	Headquarters	Humphrey	Henninger
1997	3093.8	1269.1	0.0
1998	1766.7	1333.5	0.0
1999	1185.9	1697.7	30.1
2000	4560.9	1164.6	0.0
2001	767.2	1063.6	0.0
2002	449.8	1098.6	48.5
2003	2454.7	1080.7	0.0
2004	3238.5	999.0	0.0
2005	1567.4	727.7	0.0
2006	0.0	0.0	0.0
2007	1086.1	870.8	0.0
2008	1428.2	1050.8	0.0
2009	2243.0	906.9	0.0
2010	1113.3	832.5	0.0

Predator Avoidance and Abatement

Records indicate that conflicts between large predators (bears, wolves, mountain lions) and sheep grazing have not been a substantial or recurring problem on ARS properties, even though those species have inhabited ARS properties for a number of years. It can be expected that a limited number of encounters with carnivores would continue to occur. The primary methods of limiting encounters with predators include:

- Avoidance over a large-sized land base grazed with relatively few livestock;
- The presence of full time sheep herders, guard dogs, and herd dogs; and
- The removal of associated trash and/or carcasses that might attract predators.

To date, these practices have proven effective in keeping the number of conflicts with large carnivores to a minimum. When encounters or conflicts do occur, they are addressed differently depending on the

species present, and the level of threat to the livestock or herder. Most encounters end without lethal removal.

For black bears, herders are instructed to harass (by shooting into the air) a depredating black bear. If problems persist, Animal and Plant Health Inspection Services (APHIS) Wildlife Services is contacted to investigate and follow up with control actions if warranted.

For gray wolves, (this changed recently), herders can harass but not kill a depredating wolf. Animal and Plant Health Inspection Services (APHIS) Wildlife Services would be contacted to investigate wolf depredation/conflicts, and then contact state wildlife agencies (and or U.S. Fish and Wildlife Service) for authorization to implement control actions such as trapping, collaring, or lethal removal if necessary.

For grizzly bears, herders are instructed to do everything possible to avoid an encounter. They may move the sheep to other areas of the pasture, and if problems persist, they have the option of moving sheep to other pastures/locations. If a grizzly bear is threatening sheep, herders may discharge their rifle into the air if they think it would help frighten the bear (hazing). A herder may shoot directly at a grizzly bear only if his personal safety is threatened. However, this situation has not occurred with our grazing and is not expected to occur.

The proposed action (and alternatives) would not include options to trap and transport grizzly bears or to lethally control problem grizzly bears because:

- The species is currently federally listed as threatened,
- There have been only three encounters in the past, and
- None of those encounters required removal.

Grizzly bear trapping, transportation, or lethal removal is outside the scope of this project and, thus, if needed, would require us to re-initiate consultation or conduct an emergency consultation, in order to consider the probability of incidental take.

Integrated Pest Management (NP215, Objective A.2)

Noxious Weeds

There are few weed problems on our properties. Weeds become established along roads where seeds are transported by vehicles and populations persist where there is no sheep grazing. Sheep grazing tends to prevent many weeds from establishing. Some weed species are present on adjacent lands where cattle graze, and, over time, the adjacent weeds spread on to ARS properties. Weed locations are recorded on maps as they are found. Invasive plant species infestations are GPS (Global Positioning System) mapped. Individual plants are mapped as point attributes and area or patch infestations are mapped as polygons and are targeted for annual treatment.

Precautions are taken to minimize weed spread by sheep grazing. To accomplish this, areas with weeds are grazed in spring when there is little or no risk of spreading weed seeds. We do not graze areas when weed seeds are developed and there is risk of spreading viable seeds to other areas. Animals are quarantined for six days before moving sheep from weed infested areas or from feed with potential weed seeds to other grazing units.

We use an adaptive management/integrated pest management approach for control and eradication of exotic, invasive weeds. This integrated approach is coupled with research on ecosystem functions and

native plant communities and with research on weed seed production and spread with sheep grazing. As primary weed control, this integrated approach includes the use of strategic sheep grazing as a biocontrol method to reduce the production of weed seed and spread of weeds. Specific beetle species are also used for biocontrol alone or with grazing to eliminate noxious weeds.

Herbicides are used on invasive weed species that are not consumed by sheep. Herbicides are sprayed annually along some roads and in sheep pens where invasive weeds are present. Herbicides have been used to control weeds along roadsides, in feedlots and corrals, small pastures (less than 25 acres), and near building structures for about 30 years. Herbicide use is more effective in these weed invasion areas than sheep grazing.

Herbicides application methods include: spot, handwand application to control weeds along roadsides, in dry-lots and corrals, and near building structures. Four-wheeler-mounted and tractor-mounted boom-sprayer application is done to control weeds in small pastures and in large dry-lots. Aerial application is not used.

Grazing to control *Euphorbia esula* (leafy spurge) and *Centaurea stoebe* (spotted knapweed) is done in spring or early summer when there is no or little risk of spreading weed seeds. Herbicides control for *Euphorbia esula* (leafy spurge), *Centaurea* stoebe (spotted knapweed), *Bromus tectorum L* (cheatgrass), *Cardaria draba* (*L*.) *Desv*. (globed-podded hoarycress), *Chenopodium album L*. (lamb's-quarters), *Bassia scoparia* (*L*.) A.J. Scott (burningbush), *Cirsium* spp. (tall thistle) is also done. Occasional herbicide control is done for rare sightings *Hyoscyamus niger L*. (black henbane, hog's-bean, stinking-nightshade), *Arctium lappa L*. (greater burdock), *Isatis tinctoria L*. (dyer's woad), *Hieracium cynoglossoides Arv.-Touv* (houndstongue hawkweed *P*.). Herbicides used to control weeds include: clopyralid, triclopyr amine, imazapyr, diuron, picloram, bromacil, glyphosate, 2,4-D amine, and imazapic.

Curtail and 2-4-D amine mix (11.53 gallons) was applied on about 35 acres along roadsides on Headquarters property in 2009. Twelve pounds of Krovar was applied at six pounds/acre on Headquarters feedlots in 2009. Curtail and 2-4-D amine mix (6.3 gallons) was applied on about 10 acres along roadsides and fence lines on Humphrey Ranch in 2009. Three gallons of glyphosate, GLY 4, was applied at four pints/acre on 12 acres of pasture planned for reseeding in 2009.

Design Features, Best Management Practices, Monitoring

Wildlife Conservation Measures

We implement a number of conservation measures to reduce the likelihood of potential conflicts with grizzly bear (as well as other predators) and domestic sheep/livestock. They include:

- Grizzly bear trapping, transportation, or lethal removal is outside the scope of this project. Thus, if needed, it would require us to re-initiate consultation or conduct an emergency consultation with the U.S. Fish and Wildlife Service.

- When creating research plans that include a sheep grazing component, consider the history of livestock-bear conflicts within ARS properties. If conflicts ever developed and created the likelihood of habituation, we would modify the grazing schedule and/or sheep movements to avoid recurring conflicts.

- Using good husbandry practices so that sheep are as healthy as possible, are suitable for research, and the number sick/stray animals is kept to a minimum. An institutional animal care and use committee evaluates research protocols and livestock management practices to ensure they are consistent with

good animal husbandry, and comply with Federal laws that govern the use of agricultural animals in research. Protocols and practices that do not comply are not approved.

- Sheepherders, working dogs, and guard dogs are kept with the sheep full-time when on rangelands to reduce the likelihood of encounters, and to assist in efficient and prompt movement of animals when necessary. In the summer range, sheep are accompanied by a minimum of two guard dogs, two herd dogs, and a full time sheepherder. Very few stray animals occur over the course of the season because of the close contact the sheepherders have with sheep. In the evenings, sheep are bedded on an approximate one-acre area. On moonlit nights when sheep have the tendency to get up and graze, extra vigilance is necessary to watch over sheep. Lame animals that may occur on occasion are watched closely because of the impact they have on moving the herd, and because animals need to be accounted for to maintain research objectives. Therefore, when lame animals do not recover, they are subsequently removed from the herd within a short period of time, (approximately every three days when the camp tender brings supplies) and transported back to the Headquarters property.

- All unnatural attractants to bears are minimized. This includes treatment or removal of livestock carcasses, and proper storage of human foods, garbage, and dog food. Approved "bear-proof" containers are used, and damaged containers are repaired or replaced so that they work as designed. Camp tenders and managers make periodic visits (approximately every three days) to remove trash and/or dead animal carcasses in order to eliminate potential bear attractants. In some locations, it is not feasible to remove carcasses (due to degree of decomposition and/or access to get them out). In such cases, a carcass is left in place and decomposition expedited with the addition of lime.

- At least two formal training-orientation meetings are conducted annually with our employees and herders to review identification of grizzly bear, black bear, bighorn sheep, Canada lynx, mountain lions, etc. In addition, we discuss Sheep Station sanitation and garbage removal practices, nonlethal procedures to address livestock-wildlife encounters, and who to contact should encounters occur. Training and education are ongoing and not limited to formal meetings.

- Regarding grizzly bears, herders are instructed to avoid an encounter. Moving the sheep to other areas of the pasture may occur to avoid an immediate threat, and moving sheep to other pastures/locations would occur if encounters persist.

- Sheepherders carry rifles to protect the sheep and bear spray for personal safety and to scare off inquisitive animals (we cannot issue rifles for personal safety; the rifles are to protect the sheep). If a grizzly bear is threatening sheep, herders may discharge their rifle into the air if they think it would help frighten the bear (hazing). A herder may shoot directly at a grizzly bear only if his personal safety is threatened, however this situation has not occurred with our grazing, and is not expected to occur.

- Herders are to report all bear sightings to their supervisor. When on ARS property, all existing and suspected bear activity and (or) conflicts are reported directly to Animal and Plant Health Inspection Service (APHIS), Wildlife Services. APHIS Wildlife Services then contacts state and federal agencies as necessary to conduct damage investigations.

- All sightings that are confirmed grizzly bears, or show positive evidence of grizzly bear in the vicinity of livestock would be reported by us to the Interagency Grizzly Bear Study Team (IGBST). Additional details may be developed through consultation with the U.S. Fish and Wildlife Service.

- When on USDA, Forest Service, or on DOI, Bureau of Land Management land, all existing and suspected bear activity and(or) conflicts are reported directly to the Forest Service or Bureau of Land Management contacts as well as APHIS Wildlife Services.

- In an interagency agreement with the U.S. Forest Service (USDA Forest Service/ARS 2007), the Sheep Station agrees they would comply with meeting grizzly bear management goals on the Meyers Creek and East Beaver Allotments (USDA Forest Service, see page 6) including notifying appropriate personnel of encounters, and temporarily stopping or modifying grazing as necessary, should bear conflicts arise with humans or livestock. Refer to the specific interagency agreement for details. This agreement may be updated based on future consultation between U.S. Forest Service and the U.S. Fish and Wildlife Service regarding use of the Meyers Creek Allotment. Refer to the most up to date interagency agreement for details.

Other reasonable and prudent measures may be developed as formal consultation with the U.S. Fish and Wildlife Service proceeds.

Road to Blair Lake

Mitigations to reduce, and prevent, erosion, are needed on this road from where it crosses on to ARS property to where the road ends, near Blair Lake. Mitigation measures are as follows:

- Blair Lake M1: Close road to all motorized use on ARS properties. Close road effectively where slope begins to increase, shortly after road crosses on to ARS properties. Selectively drop trees such that off-road vehicle traffic cannot detour around closure.

- Blair Lake M2: From crest of hill down to first meadows (Figure 23): Rills and gullies are starting to develop on the compacted road surface. Install water bars at the first gradient breaks to get the water off the road. Install subsequent water bars at gradient breaks until the open meadows are reached. Extend water bar at least six feet into adjacent hillside along contour or at a slight angle to the slopes gradient. Hand crews would be used to implement the recommended measures. Knock rut edges down, and fill in ruts. Place small diameter (four inches or less) brush consistently over the length of the ruts to slow any surface runoff and encourage deposition of fine grained sediment. Deposition of fine-grained sediment would provide the opportunity for re-vegetation from adjacent sources. If vegetation is not established within three years consider re-seeding.

Figure 23. Road Ruts on Road to Blair Lake

- Blair Lake M3: From first meadows to major slope break above where road ends: Install water bars at noticeable gradient breaks on ruts and road. Extend water bars at least six feet into adjacent hillside along contour or at a slight angle to the slope gradient. Place small diameter (four inches or less) consistently over the length of the ruts to slow any surface runoff and encourage deposition of fine-grained sediment. Deposition of fine-grained sediment would provide the opportunity for re-

vegetation from adjacent sources. If vegetation is not established within three years consider re-seeding.

- Blair Lake M4: From major slope break to where road ends: Install water bars at noticeable gradient breaks on ruts and road to eliminate surface runoff from road. Extend water bars at least 6 ft into adjacent hillside along contour or at a slight angle to the slope gradient. Place small diameter (4 inches or less) consistently over the length of the ruts to slow any surface runoff and encourage deposition of fine grained sediment. Deposition of fine grained sediment would provide the opportunity for re-vegetation from adjacent sources. If vegetation is not established within three years consider re-seeding.

- Blair Lake M5: At road end: Harden the sheep driveway across the stream (to minimize sediment input into stream) with gravel and small cobbles from surrounding area. In addition, harden the last 30-50 feet of the road and place a water bar at the road end to divert surface run-off. This would minimize or eliminate surface runoff and sediment from entering the creek at the road end.

Sheep Crossings

Mitigations are recommended at sheep crossings at points OD 4 and OD 5, found on the North and South Forks of Odell Creek. At the North Fork Creek (OD 4/T15S, R2W, Section 11, SW ¼) these mitigations apply to the main and secondary crossings. The following measures are recommended:

- North Fork of Odell Creek M6: At both crossings place water bars at key gradient breaks or embed 12-inch logs at this gradient breaks about 4-5 inches deep, and at an angle of 20-45 degrees across the driveway to ensure water is diverted off this area into undisturbed vegetated forest floor, which would function as a sediment filter strip.

- North Fork of Odell Creek M7: At the secondary and smaller crossing, harden the stream banks with rock , small logs, pole sized timber, or other locally obtained native material (that can harden stream banks) to prevent further degradation due to sheep crossing the stream.

- South Fork of Odell Creek (OD 5/T15S, R2W, Section 14, SW ¼) M8: The far side of the crossing comes out on to a steep slope, which is largely bare of vegetation. Currently, there are no signs of rilling or gullying, but mitigation will be implemented to prevent further degradation due to sheep crossing the stream.

- South Fork of Odell Creek M9: Harden the far bank with small rock to provide soil cover or consider developing an alternative crossing nearby where the entry and exit would not lend its self to slope issues.

Drainage at Exit from Mine Waste Water Pond

- M 10: Enhance berm development

- M11: Place large rocks as roughness elements to slow water velocity and enhance sediment deposition

- M12: Place some 10-12 inch log sections into drainage to develop step pools place larger rocks below log sections. These measures would slow water velocities and minimize erosion from flowing water.

- M13: Place rock on raw meander bank edges to provide protection in conjunction with the above mitigation measures.

Heritage

To ensure protection for cultural resources:

- A Heritage Management Plan outline has been compiled to ensure the protection of cultural resources. The foundation of this outline is three fold: provide Section 106 services, record and provide management guidelines for U.S. Sheep Experimental Station historic properties, and develop and implement a survey strategy for the Agricultural Research Service, U.S. Sheep Experimental Station, Dubois, Idaho, properties

- If unanticipated discoveries are found during project activities, cease all operations in the vicinity of the discovery until assessed by a professional archaeologist or historian.

Best Management Practices

Best Management Practices (BMPs) would be implemented for herbicide application, grazing and stream crossings. BMP measures have been proven effective across the country in managing non-point sources of pollution, and their implementation is required in both Idaho and Montana as part of the Clean Water Act (Seyedbagheri 1996, Schuler and Briggs 2000, USDA Forest Service 2002)

BMPs for Herbicides

Table 9 displays the buffer widths used during the application of herbicide.

Table 9. Summary of buffer widths by herbicide

Herbicide	Recommended Buffer Width	Comment
2, 4 D amine	25 ft [a]	If using ester form, toxic to fish
Imazapyr	Up to Edge[b]	Low toxicity to fish and algae; Mobility pH dependent;
Picloram	25 ft[a] 164 ft	Known surface and groundwater contaminant; 25 ft buffer applies to surface water drainages; 164 ft buffer applies if herbicide applied near Station groundwater wells
Bromacil	25 ft[a] 164 ft	Known groundwater contaminant; 25 ft buffer applies to surface water drainages; 164 ft buffer applies if herbicide applied near Station groundwater wells
Clopyralid	25 ft[a] 164 ft	Considered moderately toxic to fish; 25 ft buffer applies to surface water drainages; 164 ft buffer applies if herbicide applied near Station groundwater wells
Triclopyr amine	Up to Edge[b]	If ester form used, can be persistent in aquatic environment
Diuron	25 ft[a] 164 ft	Known groundwater contaminant; Moderately toxic to fish and highly toxic to aquatic plants; 25 ft buffer applies to surface water drainages; 164 ft buffer applies if herbicide applied near Station groundwater wells
Non-aquatic Glyphosate	100 ft	Relatively low toxicity to birds, mammals and fish.

a - Bonneville Power Administration, Date Unknown, Transmission System Management Program (DOE/EIS-0285)-Final EIS, Chapter 5;
b - Tu et al, Nature Conservancy Weed Management Handbook

- A contingency plan, or emergency spill plan, would document notification requirements, time requirements for notification, spill management, and parties responsible for clean up. Factors to be considered during spill cleanup are the substance spilled, the quantity, and toxicity, proximity to waters and hazard to life, property, and environment, including aquatic organisms.

- During pesticide application, an untreated buffer would be left alongside surface waters, wetlands and riparian areas. In determining buffer width, the following factors would be taken into consideration: beneficial water uses, adjacent land use, rainfall, temperature, wind speed and direction, terrain, soils, vegetative type and aquatic life. Other consideration would be type of application, persistence on-site, foliage, spray pattern and droplets and carrier.

Monitoring

For design criteria prescribed at the sheep crossings, road to Blair Lake, and for the drainage at the mine pond exit, inspections would be conducted after high precipitation events and at the beginning of each season of use. Maintenance would be conducted as needed, based on inspections. It is recommended to establish key photo points for annual monitoring and writing a short description of recovery conditions. If monitoring indicates, further work is needed address issues through additional study to enhance restoration.

Conduct water quality monitoring for herbicides located on Headquarters property for both primary auxiliary domestic water wells.

Conduct water quality monitoring during the summer of 2012 to screen for water quality concerns using the methods approved by the Idaho and Montana Departments of Environmental Quality. Conduct monitoring during the summer of 2012 to screen existing water quality conditions for turbidity, stream temperature and fecal coliform (*E. Coli*) at Beaver Creek, Tom, Odell, and Corral Creeks, as well as at the main sheep crossing at Odell Creek. Compare data results to reporting limits, method detection limits and appropriate state criteria for the monitored analytes.

A long term monitoring plan would be developed only if water quality concerns are defined during the screening phase of monitoring.

Decisions to Be Made

This environmental impact statement will evaluate the site-specific issues the public has with the proposed action, consider alternatives to the proposed action, and analyze effects of the proposed action and alternatives on the environment. Based on the purpose and need identified for the USSES Grazing and Associated Activities Project, the scope of the project is limited to decisions concerning activities within the USSES Grazing and Associated Activities Project Area. This environmental impact statement will provide the deciding official with the information to make the following decisions with regard to the Interim USSES Grazing and Associated Activities Project:

- Which actions, if any, will be approved, and
- What additional mitigation measures and monitoring requirements may be needed to protect resources?

The deciding official is Andrew C. Hammond, Agricultural Research Service Pacific West Area Director.

Public Involvement

Notice of Intent (NOI)

On November 19, 2010 a notice of the availability of the Scoping document for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010 was sent to 154 individuals and organizations who had commented on or shown interest in previous iterations of this project. At that time the Scoping document was posted on the Agricultural Research Service website: http://www.ars.usda.gov/News/docs.htm?docid=17878.

A Notice of Intent to Prepare an Environmental Impact Statement was published on Monday January 24, 2011 in the Federal Register. This began the Scoping Period for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010. The official Scoping period closed on March 11, 2011. During that time, 25 responses were received. See appendix D for Sheep Station responses to those comments.

Additional Comments Considered

See Project History (page 6) concerning the delisting of the Greater Yellowstone Area grizzly population.

The Agricultural Research Service released the Information for Public Comment, U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009 document with an extended comment period from December 11, 2009 – January 25, 2010. During that comment period 54 responses were received. These comments (see appendix E) have been considered, along with the Scoping comments received in response for the NOI, for this project.

Observers

Field surveys were conducted by USDA Forest Service, TEAMS Enterprise specialists during the following dates in 2009:

- June 21 through June 26
- July 6 through July 14
- August 4 through August 6
- August 17 through
- August 28 through September 2

Observers on the various trips included representatives from Western Watersheds and Defenders of Wildlife.

Consultation

US Fish and Wildlife Service

On May 6, 2008, and again on August 14, 2009 a list of threatened, endangered, and proposed species that may be present in the action area was discussed with the U.S. Fish and Wildlife Service (Arena 2008, personal communications; USDI Fish and Wildlife Service 2009). Results of these discussions concluded that only Canada lynx, Yellowstone Distinct Population of grizzly bear, and Northern Rocky Mountain gray wolf (currently delisted) have the potential to occur in or near the project area. Other species have no federal listing status, or do not occur in the area. No critical habitats occur in the project area.

A review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether additional field reconnaissance is needed to complete the analysis. Sources of information included interviews with Sheep Station staff, interviews with Forest

Service biologists on the Caribou-Targhee National Forest, interviews with state wildlife agency employees, review of Idaho and Montana State Natural Heritage Program databases, and published research. An independent wildlife biologist (employed by the USDA Forest Service – TEAMS Enterprise Unit) visited the sites on four separate occasions including May 6th through 8th, 2008; July 6th through 14th, 2008; June 21 through 26, 2009, and August 17th through 21st, 2009 in order to verify wildlife habitat types, observe resource conditions, review details of proposed activities, gather additional site information, and contact local biologists from state and federal agencies.

Other than Canada lynx and grizzly bear, no further analysis is needed for TEP species because they are not known or suspected to occur in the project area, and no suitable habitat is present. Effects to species without federal listing status (e.g. that were identified in the original lawsuit or those brought up during scoping with potential concerns) will be reviewed in the “Analysis of Other Species” section in the Wildlife Report.

2008 - Interim U.S. Sheep Experiment Station and Associated Grazing Activities: The project biologist met informally several times with United States Fish and Wildlife Service (FWS) staff in Chubbuck, Idaho (Arena 2008, personal communication). The initial meeting conducted on May 6, 2008 familiarized the Fish and Wildlife Service biologist with the project location and description of proposed activities. At that time, the project biologist and Fish and Wildlife Service biologist reviewed a list of species in or near the project area having federal status. A preliminary discussion of species occurrences in the area and potential project effects indicated that Canada lynx was the only federally-listed species and that effects are unlikely or minimal.

One federally-listed plant species, Ute ladies’-tresses (*Spiranthes diluvialis*), has been documented or has potential habitat near the geographic area of the Sheep Station. Upon review with the FWS, we agreed there is no habitat in the project area.

Additional phone calls and email exchanges occurred in September and October, 2008 to review potential effects to species, clarify procedural questions, and agree that the Sheep Station would work with the Chubbuck, ID Fish and Wildlife Service office as the lead contact. On December 9, 2008, the Fish and Wildlife Service concluded the consultation process for the interim grazing activities by providing written concurrence with the project biologist's determination of effects on listed species which included "Not Likely to Adversely Affect" Canada lynx (USDI Fish and Wildlife Service 2008). Similarly, the Fish and Wildlife Service acknowledged the biologist's determination that the project was "Not Likely to Jeopardize the Continued Existence of Gray Wolf".

2009 - U.S. Sheep Experiment Station and Associated Grazing Activities. On August 14, 2009, the biologist met with the Fish and Wildlife Service in Chubbuck, ID to again start the process of consultation. This phase of the project is the same as the interim phase, but activities and effects are considered over a longer time period, and with more extensive scoping and public review. At the time of this meeting, (USDI Fish and Wildlife Service 2009) Canada lynx was the only listed species in the project area. The northern Rocky Mountain distinct population segment of gray wolf had been delisted on May 4, 2009.

In September, 2009, grizzly bears in the Yellowstone DPS were restored to a status of federally listed as a threatened species. On October 1, 2009 the biologist contacted the USFWS to discuss the recent court order relisting the Yellowstone DPS of grizzly bear. Discussions included possible determinations and consultation process for control actions including hazing, trap and transport, lethal control, and personal safety if a herder is threatened by a bear. Similarly, the Sheep Station expressed their desire to participate in any upcoming Level 1 streamlined consultation meetings that occur between the USFWS and the Caribou-Targhee National Forest, which also are likely to include discussions regarding previously

analyzed projects in grizzly bear habitat. Based on the results of these discussions and a minimal history of Sheep Station encounters with grizzly bears (none with lethal control), the Sheep Station made a decision that the proposed actions and alternatives would not include trap and transport or lethal control. These activities have not occurred with Sheep Station activities in the past and are not expected to occur in the future.

Greater sage-grouse, pygmy rabbit, and northern Rocky Mountain gray wolf are all species that are not federally listed, but were recently either listed or petitioned. Therefore, there is some possibility that one or all the species could become federally listed. These species occur on Sheep Station properties and should they become listed, the Sheep Station would need to initiate (or reinitiate) consultation on the potential effects the proposed activities may have on these newly listed species. In light of the potential listing of these species, the wildlife analysis performed for the current DEIS considered whether continued operation of the proposed action would make any irreversible or irretrievable commitment of resources to these three species, vis-à-vis effects analysis, and found that continued operations would not make such a commitment. For the wolf, Sheep Station activities were analyzed in the 2008 Wildlife report when the wolf was designated as a nonessential experimental population. The biologist’s analysis and "No Jeopardy" determination was reviewed and recognized by the USFWS. Since the activities and effects of the current project are the same as analyzed in 2008 but over a longer period of time, the previous determination would be applicable until the need to reinitiate consultation is considered and/or completed. Should sage-grouse or pygmy rabbit become listed or critical habitat designated within the project area, prescribed burning activities would be deferred until consultation is completed. The current project proposal would not hinder or prevent (foreclose) the Sheep Station from implementing reasonable and prudent alternatives to protect those species (such as delaying prescribed fire treatments or modifying grazing strategies) until the consultation process is completed.

State Historic Preservation Officer

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies consider the effects that their federally funded activities and programs have on significant historic properties. "Significant historic properties" are those properties that are included in, or eligible for, the National Register of Historic Places. The National Register is a list of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, and culture. The National Register is administered by the National Park Service in conjunction with the State Historic Preservation Offices (SHPOs).

The Sheep Station has proposed several activities over the course of the next five years. In consultation with the Idaho State Historic Preservation Office (IDSHPO) the Sheep Station is developing a Heritage Management Plan. This plan will include a schedule of proposed activities for Section 106 review. Heritage surveys, recordation of sites, assessment of effects, and consultation with Idaho State Historic Preservation Office will be included in this plan. Idaho State Historic Preservation Office is currently reviewing the proposed activities to establish a baseline from which to proceed.

Informal communication has begun with both Montana and Idaho State Historic Preservation Offices. A draft of the Heritage Management Plan outline has been shared with both offices. This outline discloses the process by which Section 106 will be completed. Formal consultation with both State Historic Preservation Offices will begin with the initiation of the Section 106 process.

Tribal Consultation

Letters were sent to representatives of the Shoshone-Bannock Tribes during comment periods for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009 and for Scoping for the U.S.

Sheep Experiment Station Grazing and Associated Activities Project 2010. One response has been received to date.

Chapter 2 – Alternatives

Fourteen alternatives were considered in the development of this analysis:

- One (1) proposed action (same as No New Federal Action)
- Nine (9) alternatives eliminated from detailed study
- Four (4) alternatives to the proposed action studied in detail (carried forward from the Environmental Assessment being prepared for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009

Alternative Development

Alternatives to the proposed action (alternative 1) may come from several sources:

1. Developed in response to unresolved issues with the proposed action;
2. Developed in response to new information; and
3. Suggestions from the public during scoping.

Issue-Driven Alternatives

There were no unresolved issues with the proposed action from comments on the:

- Scoping document for the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010 or
- Information for Public Comment, U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009 document.

Therefore, there was no need to develop issue-driven alternatives.

New Information Alternatives

There was no new information that would result in development of alternatives to the proposed action than were developed during the preparation of the Environmental Assessment for U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009. While there was new information regarding the relisting of the Greater Yellowstone Area grizzly population, It was determined that no new alternatives needed to be considered in detail.

Publicly Suggested Alternatives

There were numerous alternatives suggested by the public during comment on the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2009 and Scoping comments for this project, many of which were iterations of similar suggestions. Some of the publically suggested alternatives are analyzed in detail (alternatives 2-5; see alternatives (1-5) Considered in Detail, page 55), and a number of alternatives suggested by the public were considered but eliminated from detailed study for various reasons (Alternatives eliminated from Detailed Consideration, page 52).

The majority of the alternatives suggested by the public had four main themes that were used to develop a range of reasonable alternatives to the proposed action.

1. Elimination of sheep grazing all together;
2. Elimination of sheep grazing in the Centennial Mountains to eliminate potential carnivore/livestock conflict in the wildlife corridor along the Centennials between Yellowstone and the central Idaho ecosystem;
3. Elimination of sheep grazing adjacent and within in the grizzly bear primary conservation area (PCA) to eliminate potential carnivore/livestock conflict with the grizzly bear and sheep (Note: ARS properties are not within the grizzly bear primary conservation area.); and
4. Elimination of domestic sheep grazing that is a potential threat to big horned sheep populations.

These themes were used to develop alternatives 2-5:

Alternative 2: No grazing would occur on the Headquarters, East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment.

Alternative 3: No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek allotments.

Alternative 4: No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment.

Alternative 5: No grazing would occur on Snakey Kelly and Bernice Allotments.

The following are alternative suggestions (PS A-J, listed in Table 10, below) included in public comments that relate to the lands grazed by the Sheep Station.

PS-A) An alternative that would eliminate sheep grazing in the East and West Summer Ranges, the Humphrey Ranch, the East Beaver, and Meyers Forest Service allotments, and the Henninger allotment. This would increase utilization of the Headquarters and Humphrey pastures, while providing increased protection to grizzly bears and an opportunity for the BLM to reintroduce bighorn sheep on lands north of the East and West Summer Ranges;

PS-B) A modified version of alternative 2 that does not confine grazing only to the Mud Lake feedlot and includes other opportunities for grazing on private or public lands where conflicts with wildlife do not occur;

PS-C) A modified version of alternative 3 that would maximize consistency with the Forest Service plans for forests in the Greater Yellowstone Area by ending grazing in allotments within the Primary Conservation Areas; thereby reducing conflicts between sheep and large carnivores;

PS-D) An alternative that considers limiting all grazing to only the sheep station headquarters property;

PS-E) An alternative that eliminates sheep grazing in the Centennial Mountains of both Montana and Idaho; thereby providing increased protection for grizzly bears and wolves;

PS-F) An alternative that evaluates the feasibility of relocating the Sheep Experiment Station to another location;

PS-G) An alternative that transfers the Sheep Experiment Station's function to another ARS facility;

PS-H) An alternative that makes reducing conflicts with and minimizing impacts of sheep grazing on wildlife a priority of operations and research, and ends use of the East Summer pasture and Myers Creek allotment;

PS-I) An alternative that analyzes relocation of the Sheep Station, is wildlife friendly, encompasses best management practices for making sheep production compatible with maintaining native wildlife, implements and researches the effectiveness of existing and new methods of coexistence into its research; and

PS-J) An alternative that would focus on reducing contact between domestic and bighorn sheep.

Table 10 is a matrix that displays the alternatives considered in detail and those suggested by the public that relate to the lands grazed by the Sheep Station.

Table 10. Matrix of alternatives considered in detail (alternatives 1-5) and alternatives suggested by the public (PS – A-J), by pasture, to allow or prohibit grazing (yes or no)

<table>
<tr><th>Properties</th><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3
PS-C</th><th>Alternative 4
PS-H & I</th><th>Alternative 5
PS-J</th><th>PS-A</th><th>PS-B</th><th>PS-D</th><th>PS-E</th><th>PS-F & G</th></tr>
<tr><td></td><td colspan="5">Carried forward for additional analysis</td><td colspan="5">Considered but eliminated from detailed analysis</td></tr>
<tr><td>Headquarters[a]</td><td rowspan="5">Yes</td><td rowspan="5">No</td><td>Yes</td><td rowspan="2">Yes</td><td rowspan="5">Yes</td><td>Yes</td><td rowspan="5">No</td><td>Yes</td><td rowspan="2">Yes</td><td rowspan="5">No</td></tr>
<tr><td>Humphrey[a]</td><td>No</td><td rowspan="4">No</td><td rowspan="4">No</td><td rowspan="4">No</td></tr>
<tr><td>Henninger[a]</td><td>Yes</td><td rowspan="2">Yes</td></tr>
<tr><td>East Summer[a]</td><td rowspan="2">No</td><td>No</td><td rowspan="2">No</td></tr>
<tr><td>West Summer[a]</td><td>Yes</td></tr>
<tr><td>Mud Lake Feedlot[b]</td><td rowspan="5">Yes</td><td>Yes</td><td rowspan="2">Yes</td><td rowspan="3">Yes</td><td>Yes</td><td rowspan="2">Yes</td><td>Yes</td><td rowspan="5">No</td><td rowspan="5">Yes</td><td rowspan="5">No</td></tr>
<tr><td>Snakey-Kelly[b]</td><td rowspan="4">No</td><td>No</td><td rowspan="4">No</td></tr>
<tr><td>East Beaver[b]</td><td rowspan="2">No</td><td rowspan="2">Yes</td><td>No</td><td rowspan="3">No</td></tr>
<tr><td>Meyers Creek[b]</td><td>No</td></tr>
<tr><td>Bernice[b]</td><td>Yes</td><td>Yes</td><td>No</td><td>Yes</td></tr>
<tr><td>Other Public/Private lands</td><td>--[c]</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>Yes</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td>Relocate Station</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>Yes</td></tr>
</table>

a – Pastures and properties administered by the Agricultural Research Service
b – Pastures and lands used by ARS under agreement administered by DOE, USDA- Forest Service, or DOI-Bureau of Land Management
c – Not applicable

Publicly Suggested Alternatives Eliminated From Detailed Consideration

1. *Terminate the existence of the Sheep Experiment Station, restore all public lands currently used by the Sheep Experiment Station back to usage by the ecosystem's native wildlife, and end all Congressional appropriations that might perpetuate the Sheep Experiment Station*

   The U.S. Sheep Experiment Station, Dubois, ID was established through a series of Executive Orders and Public Laws (see History of the Sheep Station at Dubois, page 1). Termination of the Sheep Station is the purview of Congress as are appropriations for maintaining the station and its research. Changes in these conditions are beyond the scope of this project.

   The United States sheep industry depends on research data from our Sheep Experiment Station and our collaborators, to improve the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep, improve nutritive and reproductive efficiency of sheep, improve sheep grazing practices, and improve land and ecosystem management. The majority of the sheep in the U.S. are produced west of the 100th meridian, which represents the historical boundary between the moist east and the arid west. Our research is more applicable to the nation's sheep flock, and lands on which the majority of the nation's sheep are grazed, than is research conducted east of the 100th meridian. We are the only USDA, Agricultural Research Service location that is focused solely on sheep research, and the only USDA, Agricultural Research Service location that can address sheep and sheep grazing issues that are focused on the region where most of the nation's sheep are produced.

   Our Sheep Experiment Station occupies a minuscule portion of the federal land in Idaho and Montana. Wildlife in the region is permitted to cross USDA, ARS properties. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. However, implementing this alternative would prevent the USDA, Agricultural Research Service from conducting research aimed at improving the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep west of the 100th meridian, improve nutritive and reproductive efficiency of sheep west of the 100th meridian, improve sheep grazing practices west of the 100th meridian, and improve land and ecosystem management west of the 100th meridian.

   Thus, this alternative was eliminated.

2. *End all livestock grazing by the Sheep Station and relocate the facility elsewhere; PS F (page 50); PS-G (page 50)*

   See response to #1 above.

   Moreover, the USDA, Agricultural Research Service does not have other lands that would support research that is focused on improving sheep productivity and grazing land and ecosystem management west of the 100th meridian. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. The results of implementing this alternative would prevent the USDA, Agricultural Research Service from conducting research aimed at improving the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep west of the 100th meridian, improve nutritive and reproductive efficiency of sheep west of the 100th meridian, improve sheep grazing

practices west of the 100th meridian, and improve land and ecosystem management west of the 100th meridian.

Thus, this alternative was eliminated.

3. *Conduct a land exchange of the East and West Summer Ranges as well as in the Humphrey pasture to allow Agricultural Research Service to continue current research*

This alternative was eliminated because there are no lands in the vicinity of our Dubois, ID Headquarters that are comparable, in terms of research opportunities and forage quantity and quality, to the East and West Summer Ranges. In addition, the proximity of the East and West Summer Ranges to our Headquarters, where our scientists and technicians are housed, is ideal for the efficient execution of research projects.

4. *Phase out existing sheep allotments and limit grazing of Sheep Station sheep to Agricultural Research Service Properties*

Grazing our sheep on USDA, National Forest Service system lands and DOI, Bureau of Land Management land permits us to minimize the grazing pressure on all of the lands. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. If our grazing on Forest Service and DOI lands were eliminated, we would have no access to winter grazing, because snow depth on ARS property exceeds the ability of sheep to reach forage, and sheep would have to be kept in feedlots. Keeping our sheep in feedlots would preclude meaningful genetic evaluation of sheep that are intended for lands west of the 100th meridian. Eliminating summer grazing on one portion of Forest Service land would create serious animal welfare issues because ewes and their lambs would be forced to compress a one- to two-week trail into one day. A number of ewes and lambs would die from such trailing stress, and this would violate the Animal Welfare Act. Eliminating summer grazing on another portion of National Forest Service system lands would force us to increase grazing pressure on our Headquarters property.

Thus, this alternative was eliminated.

5. *Consider and/or analyze other research on these lands that is valuable to American agriculture yet compatible with the landscape and the wildlife in the area lands*

Based on the evidence, our actions are compatible with the landscape and wildlife in the area, and implementing this alternative would not be expected to benefit wildlife populations or the landscape. Grazing and research that requires a grazing component are the only uses of ARS properties that are relevant to Agricultural Research Service national programs because the land is not suitable for cultivation.

Thus, this alternative was eliminated.

6. *Use bison when supplemental grazing is needed*

ARS properties are not suitable for bison, and our Sheep Station facilities were not built to contain bison. In the autumn of some years, cattle are grazed on Headquarters property, and occasionally on the Humphrey and Henninger Ranches, to reduce fuels and consume plants that sheep do not select to create a more balanced mix of shrubs, grasses, and forbs. Headquarters has no surface water and is too arid to favor bison grazing; bison seem to prefer cooler and moister conditions (Lyman and Wolverton 2002). The Humphrey and Henninger Ranches are cooler and somewhat moister than the Headquarters. However, the Humphrey and Henninger Ranches contain legacy networks of irrigation

canals, which were constructed before ARS purchased the ranches from the private sector in the 1940s that bison would damage or destroy. Overall, bison grazing would have a negative effect on ARS properties and fences.

Thus, this alternative was eliminated.

7. *PS-A (page 49) An alternative that would eliminate sheep grazing in the East and West Summer Ranges, the Humphrey Ranch, the East Beaver, and Meyers Forest Service allotments, and the Henninger allotment. This would increase utilization of the Headquarters and Humphrey pastures, while providing increased protection to grizzly bears and an opportunity for the BLM to reintroduce bighorn sheep on lands north of the East and West Summer Ranges*

   This alternative is the same as alternative 3, with the exception that the Henninger Range was added to the list of properties and allotments that cannot be grazed. The alternative strictly limits summer sheep grazing to the Headquarters Property only.

   ARS properties occupy a minuscule portion of the federal land in Idaho and Montana. Wildlife in the region is permitted to cross ARS properties. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. However, implementing this alternative would prevent the ARS from conducting research aimed at improving the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep west of the 100th meridian, improve nutritive and reproductive efficiency of sheep west of the 100th meridian, improve sheep grazing practices west of the 100th meridian, and improve land and ecosystem management west of the 100th meridian.

   Eliminating summer grazing on the East and West Summer Ranges, the Humphrey and Henninger Pastures, and the Meyers Creek and East Beaver Forest Service allotments would force us to strictly limit summer sheep grazing to Headquarters Range. There is not enough grazing land for the sheep for the summer. For a majority of the summer and fall, the sheep would have to be fed harvested feed in feedlots. Keeping our sheep in feedlots would preclude meaningful genetic evaluation of sheep that are intended for lands west of the 100th meridian.

8. *PS-B(page 49) A modified version of Alternative 2 that does not confine grazing only to the Mud Lake feedlot and includes other opportunities for grazing on private or public lands where conflicts with wildlife do not occur*

   The United States sheep industry depends on research data from our Sheep Experiment Station, and our collaborators, to improve the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep, improve nutritive and reproductive efficiency of sheep, improve sheep grazing practices, and improve land and ecosystem management. The majority of the sheep in the U.S. are produced west of the 100th meridian, which represents the historical boundary between the moist east and the arid west. Our research is more applicable to the nation's sheep flock, and lands on which the majority of the nation's sheep are grazed, than is research conducted east of the 100th meridian. Our Dubois, ID Sheep Experiment Station, is the only USDA, Agricultural Research Service location that is focused solely on sheep research, and the only USDA, Agricultural Research Service location that can address sheep and sheep grazing issues that are focused on the region where most of the nation's sheep are produced.

   Our Sheep Experiment Station occupies a minuscule portion of the federal land in Idaho and Montana. Wildlife in the region is permitted to cross USDA, Agricultural Research Service properties. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. However,

implementing this alternative would prevent the USDA, Agricultural Research Service from conducting research aimed at improving the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep west of the 100th meridian, improve nutritive and reproductive efficiency of sheep west of the 100th meridian, improve sheep grazing practices west of the 100th meridian, and improve land and ecosystem management west of the 100th meridian.

There are no in the vicinity of our Dubois, ID Headquarters that are comparable, in terms of research opportunities and forage quantity and quality, to the East and West Summer Ranges. In addition, the proximity of the East and West Summer Ranges to our Headquarters, where our scientists and technicians are housed, is ideal for the efficient execution of research projects.

Our Sheep Experiment Station is not authorized to conduct long-term research on private land or other federal lands. Therefore, implementing this alternative is not possible, and thus, would result in restricting sheep to the Mud Lake feedlot, where there is very little to graze. The sheep are fed harvested feed when they are at the Mud Lake facility. Keeping our sheep in feedlots would preclude meaningful genetic evaluation of sheep that are intended for lands west of the 100th meridian.

9. *PS-D (page 49) An alternative that considers limiting all grazing to only the sheep station headquarters property*

This alternative is the same as alternative 3, with the exception that the Henninger Pasture was added to the list of properties and allotments that cannot be grazed. The alternative strictly limits summer sheep grazing to the Headquarters Range only.

Our Sheep Experiment Station occupies a minuscule portion of the federal land in Idaho and Montana. Wildlife in the region is permitted to cross USDA, ARS properties. Based on the available evidence, the results of implementing this alternative would not be expected to change wildlife populations or movements or improve rangeland health. However, implementing this alternative would prevent the USDA, Agricultural Research Service from conducting research aimed at improving the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep west of the 100th meridian, improve nutritive and reproductive efficiency of sheep west of the 100th meridian, improve sheep grazing practices west of the 100th meridian, and improve land and ecosystem management west of the 100th meridian.

Eliminating summer grazing on the East and West Summer Ranges, the Humphrey and Henninger Pastures, and the Meyers Creek and East Beaver Forest Service allotments would force us to strictly limit summer sheep grazing to Headquarters Range. There is not enough grazing land for the sheep for the summer. For a majority of the summer and fall, the sheep would have to be fed harvested feed in feedlots. Keeping our sheep in feedlots would preclude meaningful genetic evaluation of sheep that are intended for lands west of the 100th meridian.

Alternatives (1-5) Considered in Detail

Descriptions of alternatives 2-5 display the differences between the alternative and the proposed action (alternative 1). Table 10 (page 51) displays the properties where grazing would or would not occur under alternatives 1-5. When not being grazed, sheep are maintained at the Mud Lake feedlot (see Table 3 page 25).

Alternative 1 - Proposed Action – No New Federal Action

The proposed action is also the no new federal action alternative.

There are two options for a no action alternative:

1. No new federal action – This means that ongoing federal actions would continue, but that no new or additional federal actions would take place.
2. No activities would take place – This means that if activities are occurring within the project area, all activities would cease.

The settlement agreement in Center for Biological Diversity and Western Watersheds Project, v. U.S. Sheep Experiment Station; U.S. Department of Agriculture; Agricultural Research Service; and U.S. Forest Service,[10] stipulated that:

> 1. The U.S. Agricultural Research Service shall prepare an "environmental assessment" ("EA") or "environmental impact statement" ("EIS"), pursuant to the National Environmental Policy Act ("NEPA"), regarding the grazing of sheep and related activities on ARS properties.

The proposed action was directed to be “the grazing of sheep and related activities on U.S. Sheep Experiment Station lands.” The settlement agreement did not direct the Agricultural Research Service to consider the analysis of ending all activities on the Sheep Station. Therefore, it is appropriate that the no action option is #1 – No new federal action.

The purpose of a no action alternative is to provide a baseline for analysis purposes. For this analysis the existing condition (no new federal action) serves as the baseline.

No new federal actions are proposed under this alternative, merely a continuation of the historic and existing activities already occurring on the U.S. Sheep Experiment Station, Dubois, Idaho. The proposed action would continue ongoing sheep grazing and associated activities that historically have been occurring in conjunction with our research to develop integrated methods for increasing production efficiency of sheep and to simultaneously improve the sustainability of rangeland ecosystems. These activities enable us to carry out the mission for which it was established by executive order and public law (see page 1). Details of the proposed action and mitigations are found beginning on page 20.

Alternative 2 (Map 18)

Alternative 2 is considered a ‘no grazing’ alternative, as grazing on all ARS properties would not occur.

Alternative 2 was developed to respond to the public suggestion that sheep grazing be eliminated completely from the Sheep Station operation (suggestion #1, page 49). See Table 10 (page 51) for properties used for grazing. Animal units are based on a 65 percent reduction from alternative 1 sheep inventory, which resulted in 1,166 head retained for research purposes. Table 11 demonstrates the expected distribution of AUM utilization (sheep only). Until new grazing lands are obtained, all sheep would be maintained at the Mud Lake Feedlot where harvested feeds would be fed daily to meet the nutrient needs of the sheep. The reduction in sheep inventory was necessary to remain within available funds for purchasing harvested feeds and maintaining a feedlot facility. There are a few grazeable acres at the Mud Lake facility. A small contingent of sheep (~130 head) would graze the lands surrounding Mud Lake Feedlot from April to September.

There would be 1,166 sheep retained at Mud Lake. Only 158 AUMs are grazed at Mud Lake, sheep are maintained in feedlots.

[10] Center For Biological Diversity, and Western Watersheds Project, v. U.S. Sheep Experiment Station; U.S. Department Of Agriculture; Agricultural Research Service; and U.S. Forest Service, Case No. 07-CV-0279-E-MHW

Table 11. Alternative 2: Projected annual AUM[a] utilization per property within the approximate[b] that are specified. The calculations are based on 1,166 sheep[c]; a 65 percent reduction in Alternative 1 sheep inventory (Moffet 2009, pers. comm.).

Properties	AUM [a] Available	AUM [a] Utilized	Utilization Percent	Approximate [b] Grazing Dates
ARS Properties	**48,667**	**0**		
Headquarters	28,353	0	NA	NA
Humphrey	4,476	0	NA	NA
Henninger	1,914	0	NA	NA
East Summer (Toms Creek)	4,043	0	NA	NA
West Summer (Odell Creek/ Big Mountain)	9,881	0	NA	NA
Leased (DOE, USDA- Forest Service, DOI-Bureau of Land Management)	26,087	158	0.6 %	
Mud Lake	560	158	28.2 %	April - September
Snakey-Kelly	1,756	0	NA	NA
East Beaver	17,877	0	NA	NA
Meyers Creek	3,076	0	NA	NA
Bernice	2,808	0	NA	NA

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep[c] are equivalent to one (1) AUM.
b - Depending on climatic conditions and day of the work week these dates may shift ± 7 days.
c - A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).

Alternative 3 (Map 19)

Alternative 3 was developed in response to the public suggestion that grazing be eliminated in the Centennial Mountains (suggestion #2, page 49). See Table 10 (page 51) for pastures used for grazing. Animal units are based on a 20 percent reduction from alternative 1 sheep inventory, which resulted in 2,640 head retained for research purposes. Table 12 demonstrates expected distribution of AUM utilization (sheep only). According to alternative 3, ARS properties Humphrey, East Summer, and West Summer, and USDA, Forest Service allotments Meyers Creek and East Beaver would not be grazed. The majority AUM s needed would be taken from the Sheep Station Headquarters property. Because of lower water availably and reduced forage quality of this property, the sheep inventory was reduced.

Forage available and AUMs used for alternative 3 shown in Table 12 is based on a 20 percent reduction in alternative 1 (proposed action) sheep numbers, the best available plant productivity estimates, and the high from the last 10 years of sheep inventory data (Moffet 2009, personal communication) and demonstrates the expected distribution of AUM utilization (sheep only) for the past 10 years, present, and future. AUMs used are based on days shown in Table 12. Actual days when sheep would be on the range vary from year to year depending on weather and plant conditions. Average days and rounded sheep numbers, for a typical year, when sheep would be moved on and off each range are shown in Table 2-B (alternative 2 - general sheep movement schedule; appendix B, page 32).

Table 12. Alternative 3: Projected annual AUM[a] utilization per property within the approximate[b] dates that are specified. The calculations are based on 2,640 sheep[c]; a 20 percent reduction in alternative 1 sheep inventory.

Properties	AUM [a] Available	AUM [a] Utilized	Utilization Percent	Approximate [b] Grazing Dates
ARS Properties	**48,667**	**2,873**	**5.9 %**	
Headquarters	28,353	2,577	9.1 %	April 23 – November 1
Humphrey	4,476	NA	NA	N/A
Henninger	1,914	296	15.5 %	June 1 – Oct 20
Summer East (Toms Creek)	4,043	NA	NA	N/A
Summer West (Odell Creek/ Big Mountain)	9,881	NA	NA	N/A
Allotments under MOU (DOE, USDA- Forest Service, DOI-Bureau of Land Management)	**26,087**	**1,015**	**3.9 %**	
Mud Lake	560	158	28.2 %	April 1 – June 15
Snakey-Kelly	1,756	337	19.2 %	November 8 – December 15
East Beaver	17,877	NA	NA	N/A
Meyers Creek	3,076	NA	NA	N/A
Bernice	2,808	520	18.5 %	December 15 – February 5

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep are equivalent to one (1) AUM.
b - Depending on climatic conditions and day of the work week these dates may shift ± 7 days.
c -A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s)

Alternative 4 (Map 20)

Alternative 4 was developed in response to the public suggestion that grazing be eliminated adjacent and within in the grizzly bear primary conservation area (PCA) (suggestion #3, page 20) (Note: Agricultural Research Service properties are not within the grizzly bear primary conservation area.). See Table 10 for pastures used for grazing. Animal units are based on a 10-year sheep inventory high of 3,331 head. Table 13 demonstrates expected distribution of AUM utilization (sheep only). No reduction in sheep inventory would be required. According to alternative 4, Sheep Station properties East Summer and USDA-Forest Service property Meyers Creek would not be grazed. The majority AUM needed would be taken from Sheep Station West Summer Range.

Table 13 is based on calculations using the best available plant productivity estimates and the high from the last 10 years of sheep inventory data (Moffet 2009, personal communication) and demonstrates the expected distribution of AUM utilization (sheep only) for the past 10 years, present, and future. AUMs used are based on days shown in Table 13. Actual days when sheep would be on the range vary from year to year depending on weather and plant conditions.

Alternative 4 is similar to alternative 1, but there would be no grazing on East Summer Range and no grazing on Meyers Forest Service allotment. Average days and rounded sheep numbers, for a typical year, when sheep are moved on and off each range are shown in Table 3-B (alternative 4 - general sheep movement schedule; appendix B, page 37).

Table 13. Alternative 4: Annual AUM[a] utilized per property within the approximate[b] dates that are specified. The calculations are based on 3,330 sheep[c]; no reduction in alternative 1 sheep inventory is necessary.

Properties	AUM [a] Available	AUM [a] Utilized	Utilization Percent	Approximate [b] Grazing Dates
ARS properties	**48,667**	**3,382**	**7.0 %**	
Headquarters	28,353	1,598	5.6 %	April 23 – June 25; September 1 – November 1
Humphrey	4,476	603	13.5 %	June 1 – October 20
Henninger	1,914	470	24.6 %	June 25 – July 9; August 31 – September 15
Summer East (Toms Creek)	4,043	0	0 %	N/A
Summer West (Odell Creek/ Big Mountain)	9,881	711	7.2 %	July 9 – August 31
Allotments under MOU (DOE, USDA- Forest Service, DOI-Bureau of Land Management)	**26,087**	**1,445**	**5.5%**	
Mud Lake	560	160	28.6 %	April 1 – June 1
Snakey-Kelly	1,756	421	24.0 %	November 8 – December 15
East Beaver	17,877	213	1.2 %	July 3 – September 1
Meyers Creek	3,076	0	0 %	N/A
Bernice	2,808	650	23.2 %	December 15 – February 5

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep are equivalent to one (1) AUM.
b - Depending on weather conditions and day of the work week these dates may shift ± 7 days.
c - A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).

Alternative 5 (Map 21)

Alternative 5 was developed in response to the public suggestion that grazing be eliminated to protect big horned sheep populations (suggestion #4, page 49). See Table 10 (page 51) for pastures used for grazing. Animal units are based on a 30 percent reduction from alternative 1 sheep inventory, which resulted in 2,332 head retained for research purposes. Table 14 demonstrates expected distribution of AUM utilization (sheep only). According to alternative 5, USDA-Forest Service and DOI-Bureau of Land Management properties Snakey-Kelly and Bernice, respectively, would not be grazed. Until new winter grazing lands are obtained, sheep would be maintained at Mud Lake Feedlot where harvested feeds would be fed daily to meet the nutrient needs of the sheep. The reduction in sheep inventory was necessary to remain within available funds for purchasing harvested feeds and maintaining a feedlot facility.

Table 14 is based on calculations using the best available plant productivity estimates and the high from the last 10 years of sheep inventory data (Moffet 2009, personal communication) and demonstrates the expected distribution of AUM utilization (sheep only) for the past 10 years, present, and future. AUMs used are based on days shown in Table 14. Actual days when sheep would be on the range vary from year to year depending on weather and plant conditions. Average days and rounded sheep numbers, for a typical year, when sheep are moved on and off each range are shown in Table 4-B (alternative 5 - general sheep movement schedule; Appendix B, page 44).

Table 14. Alternative 5: Annual AUM[a] utilized per property within the approximate[b] dates that are specified. The calculations are based on 2,332 sheep[c]; a 30 percent reduction in alternative 1 sheep inventory is necessary (Moffet 2009, Pers. Comm.).

Properties	AUM [a] Available	AUM [a] Utilized	Utilization Percent	Approximate [b] Grazing Dates
ARS properties	**48,667**	**1967**	**4.0 %**	
Headquarters	28,353	1119	3.9 %	April 23 – June 25; September 1 – November 1
Humphrey	4,476	422	9.4 %	June 1 – October 20
Henninger	1,914	318	16.6 %	June 25 – July 9; August 31 – September 15
Summer East (Toms Creek	4,043	108	2.7 %	July 23 – August 31
Summer West (Odell Creek/ Big Mountain	9,881	350	3.5 %	July 9 – August 31
Allotments under MOU (DOE, USDA- Forest Service, DOI- Bureau of Land Management)	**26,087**	**365**	**1.4 %**	
Mud Lake	560	166	29.6 %	April 1 – June 1
Snakey-Kelly	1,756	0	0 %	N/A
East Beaver	17,877	149	0.8 %	July 3 – September 1
Meyers Creek	3,076	50	1.6 %	July 5 – July 23
Bernice	2,808	0	0 %	N/A

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep are equivalent to one (1) AUM.
b - Depending on weather conditions and day of the work week these dates may shift ± 7 days.
c - A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s)

Associated Activities for Alternatives 2-5

Table 15 on the following page displays the differences among alternatives 2-5 and the proposed action (alternative 1) for the following associated activities.

Table 15. Alternatives 2-5 associated activities for alternatives 2-5 (alternative 1 discussed in detail in the proposed action beginning on page 20)

Activity/Mitigation	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No grazing would occur on the Headquarters, East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	**No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek allotments.**	**No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment**	**No grazing would occur on Snakey Kelly and Bernice Allotments**
Sheep Trail and Driveway Use and Maintenance				
Trails	None used	No trailing to Humphrey and East Beaver	No trail beyond the Dry Creek road to the Meyers Creek allotment or back off East Summer range.	No trailing to Snakey Kelly
Driveways	None used	None used	Toms units 5-7 not used	Same as alternative 1
Stock Water Operations - Water Developments				
Headquarters, Humphrey and Henninger	None used	No water troughs used on Humphrey No water diversion on Humphrey	Same as alternative 1	
West Summer Range		Would not use		
Camp Tending - Sheep Herding Camps				
Headquarters, Humphrey and Henninger Camps	None Used	No camps at Humphrey	Same as alternative 1	
		No camps	No camps on East Summer	Same as alternative 1
Fences				
Pasture Fences		None on West Summer	Same as alternative 1	
Horse Corral				
Exclosures				
Maintenance and repair of existing roads and fire breaks				
Roads	None created or maintained	No road maintained in West Summer	Same as alternative 1	
Firebreaks				

Table 15. Alternatives 2-5 associated activities for alternatives 2-5 (alternative 1 discussed in detail in the proposed action beginning on page 20)

Activity/Mitigation	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No grazing would occur on the Headquarters, East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	**No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek allotments.**	**No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment**	**No grazing would occur on Snakey Kelly and Bernice Allotments**
Range Improvement				
Prescribed Burning	No activities	Same as alternative 1		
Seeding		No seeding on Humphrey	Same as alternative 1	
Cattle and Horse Grazing	None	No supplemental grazing on Humphrey	Same as alternative 1	
Predator Avoidance and Abatement	Same as alternative 1, use as needed			
Integrated Pest Management – Noxious weeds	Ability to monitor is severely limited on properties where herders, camp tenders, etc. are not riding over the land.			
Grizzly Bear	Not needed	Same as alternative 1		
Sheep Driveway	Not needed		No Driveways On East Summer	Same as alternative 1
Heritage	Same as alternative 1			

Table 16 displays the changes in AUM utilization for the ARS properties, allotments, and the Mud Lake feedlot. Under alternatives 1-5, alternatives 2, 3, and 4 have reduced numbers of sheep that would be grazed, and alternative 4 would graze the same number of sheep.

The configuration of where grazing occurs varies by alternative. In general there is a reduction from minus one (-1) to 100 percent across alternatives and properties. Because of the need to reconfigure grazing options, there are several instances where sheep grazing numbers would increase over alternative 1 (See Table 3, Table 11, Table 12, and Table 14).

- Under alternative 3 there would be an increase of 61 percent in sheep grazed at headquarters, but only an increase in utilization of 3.5 percent
- Alternative 4 would see a 3 percent increase in grazing on Henninger Ranch (a 0.8 percent increase in utilization), and a 42 percent increase in grazing on the west summer range (a 2.1 percent increase in utilization).
- Alternative 5 there would be a 3 percent increase in sheep numbers at the Mud Lake feed lot (a 1.0 percent increase in utilization).

Table 16. Available AUMs and percent AUMs used by alternative for each property

Property	Available AUMs [a]	Percent of Available AUMs used by Alternative				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
ARS properties	48,667	6.8%	0.0%	5.9%	7.0%	4.0%
Headquarters	28,353	5.6 %	0.0%	9.1%	5.6%	3.9%
Humphrey	4,476	13.5 %	0.0%	0.0%	13.5%	9.4%
Henninger	1,914	23.8 %	0.0%	15.5%	24.6%	16.6%
East Summer Range (Toms Creek)	4,043	3.8 %	0.0%	0.0%	0.0%	2.7%
West Summer Range (Odell Creek/ Big Mountain)	9,811	5.1 %	0.0%	0.0%	7.2%	3.5%
Allotments under MOU (DOE, USDA- Forest Service, DOI-Bureau of Land Management)	26,087	5.8 %	0.6%	3.9%	5.5%	1.4%
Mud Lake	560	28.6 %	28.2%	28.2%	28.6%	29.6%
Snakey-Kelly	1,756	24.0 %	0.0%	19.2%	24.0%	0.0%
East Beaver	17,887	1.2 %	0.0%	0.0%	1.2%	0.8%
Meyers Creek	3,076	2.3 %	0.0%	0.0%	0.0%	1.6%
Bernice	2,808	23.2 %	0.0%	18.5%	23.2%	0.0%

a- Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep are equivalent to one (1) AUM.

Comparison of Alternatives

Mission and Purpose and Need

The United States sheep industry depends on research data from the U.S. Sheep Experiment Station, Dubois, ID and its collaborators, to improve the genetic potential of the nation's maternal and paternal breeds or composite lines of sheep, improve nutritive and reproductive efficiency of sheep, improve sheep grazing practices, and improve land and ecosystem management. The majority of the sheep in the U.S. are produced west of the 100th meridian, which represents the historical boundary between the moist east and the arid west. Our research is more applicable to the nation's sheep flock, and lands on which the majority

of the nation's sheep are grazed, than is research conducted east of the 100th meridian. We are the only USDA, Agricultural Research Service location that is focused solely on sheep research, and the only USDA, Agricultural Research Service location that can address sheep and sheep grazing issues that are focused on the region where most of the nation's sheep are produced.

We are the only sheep research station in the US doing research with sheep in extensive management systems – open range, high elevations. Research is done to develop animals with fitness traits or genetics suited to the extensive range conditions. Research purpose is to develop animals with genetics adapted to that environment.

Keeping our sheep in feedlots (alternative 2) and/or eliminating the high-elevation summer grazing (alternatives 2 and 3) would preclude meaningful genetic evaluation of sheep that are intended for lands west of the 100th meridian. Production environment affects the expression of functional genes linked to important production traits. Under alternative 5, the loss of the winter grazing component would affect the genetic evaluation component of the research goals and objectives

As we are the only sheep experiment station west of the 100th meridian with research focused on grazing extensive high elevation ranges for sheep production, elimination of summer grazing on the East and/or West Summer ranges (alternatives 2-4) in whole or part would mean that the objectives of studies or research at high elevation (summer range pastures) would not be met. It would also preclude research into predator avoidance and abatement.

- Studies are done with domestic stock grazing plants detrimental to livestock and wild ungulates; larkspur (*Delphinium andersonii*), lupine (*Lupinus perennis*), and Senecio (*Senecio* spp.). The Sheep Experiment Station, Dubois, is conducting research in conjunction with the Poisonous Plant Research Station, ARS, Logan, Utah.
- Genetic test or development of animals adapted to high elevation extensive ranges are done to determine what animals perform best under these environmental conditions.
    - Additional research includes:
    - Bed ground nutrient movement
    - Stream crossings on sheep driveways
    - Plant community diversity of grazed lands at high elevations

Table 17. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
U.S. Sheep Experiment Station National Action Plans 101 and 215 (See pages 16-18)				
NP 101 Action Plan **Component 1: Understanding, Improving, and Effectively Using Animal Genetic and Genomic Resources** Problem Statement 1B**:** Identify Functional Genes and Their Interactions. Problem Statement 1D**:** Develop and Implement Genome-Enabled Genetic Improvement Programs. Activities linked with this component**:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement **Component 2: Enhancing Animal Adaptation, Well-Being and Efficiency in Diverse Production Systems** Problem Statement 2A**:** Enhance Animal Well-Being and Reduce Stress in Livestock and Poultry Production Systems. Problem Statement 2B**:** Reducing Reproductive Losses. All activities linked with this component would occur, and the research associated with this component would continue Problem Statement 2C**:** Improving Efficiency of Nutrient Utilization and Conversion to Animal Products. Activities linked with this component**:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management **Component 3: Measuring and Enhancing Product Quality** Problem Statement 3A**:** Developing Systems for Reducing Variation in Product Quality and Yield. **Activities linked with this component**: Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: All activities linked with these components would occur, and the research associated with these components would continue	GREATEST IMPACT TO PROGRAM; DOES NOT MEET: Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Reduction in sheep numbers would adversely affect some existing research. Would preclude genetic evaluation of sheep that are	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Reduction in sheep numbers could adversely affect some existing research. Would preclude genetic evaluation of sheep that are intended for lands west of the	MEETS SOMEWHAT: Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Reduction in sheep numbers could adversely affect some existing research. Would preclude or limit genetic evaluation of sheep that are intended for lands west of the 100th meridian. Would limit genetic evaluation of sheep that are intended for	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Reduction in sheep numbers could adversely affect some existing research. Would limit genetic evaluation of sheep that are intended for lands west of the 100th meridian. Would preclude or limit research necessary to the

Table 17. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	intended for lands west of the 100th meridian. Would preclude research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products Would preclude research involving prescribed burning, seeding, and cattle and horse grazing activities that influence availability of nutrients on western U.S. rangelands and, thus, the well-being of sheep.	100th meridian. Would preclude research into predator avoidance and abatement Would preclude research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products Would limit research involving seeding and cattle and horse grazing activities that influence availability of nutrients on western U.S. rangelands and, thus, the well-being of sheep	lands west of the 100th meridian. Could limit research into predator avoidance and abatement. And would limit predator avoidance and abatement that maintains safe and productive environments for research sheep. Would somewhat limit research necessary to the development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would somewhat limit research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products	development of genetic improvement programs needed to enhance adaptability, productivity, and suitability of sheep that are grazing western U. S. rangelands, and to enable the Sheep Station to develop and evaluate environmentally adapted breeds and genetic lines of sheep. Production environment affects the expression of functional genes linked to important production traits. Would preclude or limit research to develop management strategies needed to enhance sheep well-being in diverse production environments and ensure efficient reproduction and conversion of nutrients from rangelands to sheep products

Table 17. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
NP 215 (Formerly 205) Action Plan **Component 1: Rangeland Management Systems to Enhance the Environment and Economic Viability.** Problem Statement A**:** Need for economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems. Problem Statement B**:** Need for improved livestock production systems for rangelands that provide and use forages in ways that are economically viable and enhance the environment sustainable. Problem Statement C**:** Need for improved rangeland restoration, rehabilitation and mitigation practices, germplasm, tools and strategies to restore rangeland integrity in a manner that is economically feasible and environmentally acceptable. **Activities linked with this component:** Sheep grazing, prescribed burning, seeding, cattle and horse grazing, predator avoidance and abatement, and integrated pest management **Component 2. Pasture Management Systems to Improve Economic Viability and Enhance the Environment** Problem Statement D**:** Need for appropriate plant materials to improve the economic viability and enhance the environment in pasture-based livestock systems. Problem Statement J**:** Need for economically viable, energy efficient and environmentally enhancing production systems for establishing, growing, maintaining, harvesting, treating, storing and transporting forages for livestock, bioenergy, bioproducts and conservation objectives. **Activities linked with this component:** Sheep grazing, seeding, and integrated pest management				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: All activities linked with these components would occur, and the research associated with these components would continue	GREATEST IMPACT TO PROGRAM; DOES NOT MEET Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Reduction in sheep numbers would adversely affect some existing research. Would preclude research involving economically viable rangeland management practices, germplasm, technologies and strategies to	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Reduction in sheep numbers could adversely affect some existing research. Would limit research involving economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands	MEETS SOMEWHAT: Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Research currently involving these areas and some sheep grazing and predator avoidance and abatement could not occur Would limit research involving economically viable rangeland management practices, germplasm, technologies and strategies to conserve and enhance rangelands ecosystems.	MEETS SOMEWHAT: Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Research currently involving these areas could not occur. Reduction in sheep numbers could adversely affect some existing research.

Table 17. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	conserve and enhance rangelands ecosystems. Would preclude activities necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would preclude seeding Required to evaluate restoration, rehabilitation, and mitigation activities to manage disturbed sites (e.g., road sides, firebreaks, historical borrow pits, and mines) that may be susceptible to weed invasion or erosion. Would preclude sheep grazing, prescribed burning, seeding, cattle and horse grazing, and integrated pest management components necessary to developing rangeland monitoring tools. Seeding, prescribed burning, and sheep grazing activities are needed to evaluate plant species that are developed for rangeland improvement programs. Would preclude predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives. Would preclude activities	ecosystems. Would preclude or limit activities necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude or limit cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would preclude or limit seeding required to evaluate restoration, rehabilitation, and mitigation activities to manage disturbed sites (e.g., road sides, firebreaks, historical borrow pits, and mines) that may be susceptible to weed invasion or erosion. Would preclude or limit sheep grazing, prescribed burning, seeding, cattle and horse grazing, and integrated pest management components necessary to developing rangeland monitoring tools. Seeding, prescribed burning, and sheep grazing activities are needed to evaluate plant species that are developed for rangeland improvement programs. Would preclude or limit predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives. Would preclude or limit	Would preclude or limit activities necessary for developing management practices that enhance viability and productivity of western U.S. grazing lands. Would preclude or limit cattle and horse grazing required to manage decadent forage, maintain range condition and reduce the risk of fire on research lands Would or limit predator avoidance and (or) abatement, depending upon species, that is necessary to maintain sheep grazing density and duration at levels specified by research objectives.	

Table 17. Comparison of alternatives by National Program 101 and 215 applicable components and purpose and need

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	required to plant, establish, maintain, and evaluate forages.	activities required to plant, establish, maintain, and evaluate forages.		
Purpose and Need To provide for the continuation of historic and ongoing grazing and associated activities at the Sheep Station in support of the mission of the ARS, USSES in Dubois, Idaho.				
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey-Kelly and Bernice Allotments
NO IMPACT; MEETS: Continuation of historic and ongoing grazing and associated activities at the USSES Station in support of the mission of the ARS, USSES in Dubois, Idaho would occur.	GREATEST IMPACT TO PROGRAM; DOES NOT MEET: Historic and ongoing grazing and associated activities at the Sheep Station would not occur. Sheep numbers available for research would be reduced by 65% over the current numbers of research animals. Grazing would be limited to 158 AUMs for part of the year at the Mud Lake Feedlot, and the rest of the sheep would remain in the Mud Lake Feedlot. Because sheep numbers would be decreased by 65% and essentially all grazing and supporting activities would be eliminated, research would essentially be terminated.	MEETS SOMEWHAT Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would be reduced by 20% over the current numbers of research animals. Grazing would be eliminated from East Summer, West Summer Ranges, and Humphrey Ranch as well as on the following allotments: East Beaver and Meyers Creek allotments. Because sheep numbers would be decreased by 30% and all grazing at high elevations, grazing elsewhere, and supporting activities would be eliminated or altered, research would be severely limited.	MEETS SOMEWHAT: Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would not be reduced over the current numbers of research animals. Grazing would be eliminated from East Summer Range as well as on the Meyers Creek allotment. Because some grazing at high elevations, grazing elsewhere, and supporting activities would be eliminated or altered, research could be limited.	MEETS SOMEWHAT: Historic and ongoing grazing and associated activities at the Sheep Station would not occur at the existing levels. Sheep numbers available for research would be reduced by 30% over the current numbers of research animals. Grazing would be eliminated from Snakey-Kelly and Bernice Allotments. Because sheep numbers would be decreased by 20% some grazing, and supporting activities would be eliminated or altered, research could be limited.

Comparison of Resource Effects by Alternative

Table 18 displays the summary of resource effects by alternative. For detailed analyses, see the individual resource sections in the Environmental Effects section of this document or the individual specialist reports found in the project file.

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed action / no new federal action	No grazing would occur on the East Summer, West Summer, Henninger, and Humphrey Pastures as well as on the following allotments: Snakey Kelly, East Beaver, Bernice, and Meyers Creek allotment	No grazing would occur on the East Summer, West Summer, and Humphrey Pastures as well as on the following allotments: East Beaver and Meyers Creek allotments.	No grazing would occur on the East Summer Range as well as on the Meyers Creek allotment	No grazing would occur on Snakey Kelly and Bernice Allotments
Range				
Headquarters/Humphrey /Henninger/East and West Summer Range - Continued current grazing would have little effect on this range Mud Lake Feedlot/ Snakey, Kelly, Bernice, and Meyers Creek Allotments - No change is expected from continued current management	Ending grazing would have little effect on Headquarters, Humphrey, and East Summer /West Summer. Weed control would not continue, and this could result in increasing weed populations On Henninger, range vegetation condition would probably move to fair with an upward trend. Invasive weed control and fence maintenance would not continue. Smooth brome (non-native grass) would remain on site and could replace some native species. Mud Lake Feedlot, Snakey, Kelly, Bernice, and Meyers Creek Allotments - no change is expected from continued current management.	Headquarters/Humphrey East Summer /West Summer Ending grazing would have little effect on these range properties Mud Lake Feedlot - Continued growing season use of available AUMs could reduce more palatable plants, affect species diversity and create conditions more favorable for noxious weeds. Snakey, Kelly, Bernice, and Meyers Creek Allotments – Ending grazing would have little effect	Headquarters - although much of the forage would be provided by increased use on property, forage use is well within acceptable standards and would provide desirable range conditions. Henninger - Forage use would be reduced, deferred grazing during the growing season would be lost and could affect species diversity. Smooth brome could spread to new areas. Humphrey/Summer West and Mud Lake Feedlot, Snakey, Kelly, and Bernice, – Same as alternative 1. East Summer Range and Meyers Creek Allotment – Same as alternative 2	Headquarters/Humphrey/ Henninger/East Summer/ West Summer and Mud Lake Feedlot, and Meyers Creek Allotment Effects same as alternative 1. Snakey, Kelly, and Bernice Allotments – Same as alternative 2

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Federally-Listed Wildlife Species				
Canada Lynx (Lynx canadensis) U. S. Sheep Experiment Station Grazing and Associated Activities Project 2011, "may affect, but is not likely to adversely affect Canada lynx." The project would have "No Effect" on critical habitat as none is present or proposed within the project area.				
For all alternatives there is a very low probability of Canada lynx occurrences on Agricultural Research Service properties				
Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.	Elimination of all grazing and associated activities in the Centennial Range would eliminate the potential effects	Elimination of all grazing and associated activities in the Centennial Range would eliminate the potential effects	Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.	Minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.
***Grizzly Bear* (*Ursus arctos horribilis*)**				
"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"	"No Effect" on the Yellowstone Distinct Population Segment of grizzly bears	"No Effect" on the Yellowstone Distinct Population Segment of grizzly bears	"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"	"May affect, but is not likely to adversely affect the Yellowstone Distinct Population of grizzly bear"
Gray Wolf (Canis lupus) Northern Rocky Mountain Distinct Population Segment. Currently not a listed species. Determination applies if returned to previous federal status of nonessential experimental population)				
"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"	"Not likely to jeopardize the continued existence of the gray wolf or adversely modify proposed critical habitat"
Other Wildlife Species				
Rocky Mountain Bighorn Sheep (Ovis canadensis canadensis) Not a federally listed species. State game species with controlled hunts in some areas				
Not directly affected by grazing on any of the ARS properties	Removal of Sheep Station grazing on the Bernice and Snakey/Kelly allotments would reduce one potential vector of respiratory disease transmission. It is speculative that this alternative would result in an observable change in the existing bighorn sheep herds' condition, health, or population.	Not directly affected by grazing on any of the ARS properties	Not directly affected by grazing on any of the ARS properties	Removal of Sheep Station grazing on the Bernice and Snakey/Kelly allotments would reduce one potential vector of respiratory disease transmission. It is speculative that this alternative would result in an observable change in the existing bighorn sheep herds' condition, health, or population.

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Greater Sage-grouse (Centrocercus urophasianus) Currently not a listed species, details included in the Wildlife Report				
Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.	Eliminates direct disturbance and displacement of grouse, but also eliminates benefit that maintain leks and improves habitat mosaic between forbs, grasses, and shrubs.	Larger number of sheep on headquarters and Henninger for longer duration increase disturbances to sage-grouse.	Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.	Benefits to habitat derived from increased mosaic of shrubs, forbs, grasses, and maintained lek sites. Small temporary displacement from grazing sheep during early brood rearing. Overall balance between positive and negative effects are neutral.
Pygmy Rabbit (Brachylagus idahoensis) Currently not a listed species, details included in the Wildlife Report				
Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.	Pygmy rabbits would persist with population numbers and trends slightly increased from the current condition. Eliminates any sheep interaction with or displacement of pygmy rabbits.	Pygmy rabbits would persist with population numbers and trends slightly reduced from the current condition. Longer temporal disturbances from sheep with additional displacement of pygmy rabbits.	Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.	Pygmy rabbits would persist with population numbers and trends similar to the current condition. Prescribed or wildland fires would temporarily reduce portions of pygmy rabbit habitat until shrub cover returns to a mature state.
Connectivity habitat for wide- ranging carnivores (Concern brought up during public scoping). Details included in the Wildlife Report				
Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.	Carnivore use of the Centennial Mountain range would continue similar to the current condition, with additional potential for black bears and wolves to more fully utilize the current habitat within a given homerange. Changes in the effectiveness of the Centennial Range as a wildlife migration corridor remain speculative, but are unlikely since evidence suggests that Sheep Station activities have a minimal effect to wide ranging carnivore use of the habitat.	Carnivore use of the Centennial Mountain range would continue similar to the current condition, with additional potential for black bears and wolves to more fully utilize the current habitat within a given homerange. Changes in the effectiveness of the Centennial Range as a wildlife migration corridor remain speculative, but are unlikely since evidence suggests that Sheep Station activities have a minimal effect to wide ranging carnivore use of the habitat.	Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.	Carnivore use of the Centennial Mountain range would continue similar to the current condition. Would not reduce connectivity in the Centennial Range. Large carnivores travel through and/or occupy habitat mostly without disturbance because of the large scale of available habitat, and sheep bands occupy only a small acreage for short duration. Lethal control actions would remain minimal and at levels similar to past actions. Lethal control would not occur for grizzly bears.

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fish and Amphibians Details included in the Wildlife Report				
No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	Vacated stream crossings and watering areas would rehabilitate naturally. Downstream effects to fisheries and amphibian habitats from Sheep Station activities would remain negligible.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.	No effects would occur to arctic grayling, westslope cutthroat trout, or Yellowstone cutthroat trout. Effects to spotted frogs, boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Interdisciplinary review of current aquatic conditions found stable stream channels, non-erosive banks, functioning flood plains, dense willows, and vigorous riparian vegetation is the dominant characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur.
Infrastructure				
There would be no changes to the activities associated with the infrastructure.	The only activities that would continue would be: maintenance of roads to the headquarters area and the Mud Lake Feedlot; trucking between the Mud Lake Feedlot and Headquarters feedlot facility; and maintenance of the firebreak around the headquarters area.	Roads, fences, and firebreaks would continue to be maintained as necessary; sheep would continue to be transported to winter ranges and Mud Lake Feedlot by truck; sheep would continue to be trailed to Henninger and Snakey-Kelly;	Roads, fences, and firebreaks would continue to be maintained as necessary; sheep would continue to be transported to winter ranges and Mud Lake Feedlot by truck; sheep would continue to be trailed to Henninger, Snakey-Kelly, and West Summer; driveways in West Summer would continue to be used	Same as alternative 1, with the exception that trailing would only take place to Henninger and East and West Summer

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Sheep				
There would be no change from the existing sheep herd (3,300 sheep)	35% of herd retained (1,155 sheep); 65% of sheep disposed of (2,145 sheep)	80% of herd retained (2,640 sheep); 20% of sheep disposed of (660 sheep)	There would be no change from the existing sheep herd (3,300 sheep)	70% of herd retained (2,310 sheep); 30% of sheep disposed of (990 sheep)
Soils				
Soils stable and productive except for low veg/soil state at Henninger. Maintains active noxious weed abatement program, though uses Krovar at feedlots. Maintains natural fire cycle at Headquarters.	Soils stable, possible increased leaf litter at Headquarters, Henninger, and Summer Range. Improved riparian soils on Beaver Creek willow tributary. Less potential weed dispersal from sheep, but less active weed control measures.	Soils stable, except continued low veg/soil state at Henninger. Improved riparian soils at Beaver Creek willow tributary. Possible increased leaf litter at Summer range. Maintains active noxious weed abatement program, though uses Krovar at feedlots. Maintains natural fire cycle at Headquarters.	Soils stable at Headquarters and Humphrey. Improved riparian soils at Beaver Creek willow tributary; Possible decreased plant vigor, litter production at Henninger and West Summer pasture. Decreased risk of invasive plants, though use of Krovar in feedlots; Maintains natural fire cycle at Headquarters.	Soils stable, possible increased leaf litter at Henninger and Summer Range. Decreased risk of invasive plants, though use of Krovar in feedlots. Maintains natural fire cycle at Headquarters.
Hydrology				
All proposed alternative would meet the intent of the Clean Water Act and the Executive Orders for wetlands and floodplains.				
No Change from present	No Change from present	No Change from present	No Change from present	No Change from present
Botany				
There would be no impacts to federally listed plant species from any alternatives proposed because no species occur and no habitat for federally listed plant species is present within Agricultural Research Service properties. All alternatives proposed within this environmental assessment would be in compliance with threatened and endangered plants according to the Endangered Species Act.				
Heritage				
Selection of any alternative would require Heritage review and compliance				
Socioeconomics				
No change in social or economic conditions	There would be no change in total amount of salary paid due to change in staff positions. Research scientist positions would replace technicians and herders not needed for operations under Alt 2 and 3.	There would be no change in total amount of salary paid due to change in staff positions. Research scientist positions would replace technicians and herders not needed for operations under Alt 2 and 3.	No change to employment and income conditions, and consequently no effect on household migration patterns and public services	No change to employment and income conditions, and consequently no effect on household migration patterns and public services

Table 18. Comparison of alternatives by resource effects

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Environmental Justice				
No change in the current economic conditions, and would not have any impact on minority or low income populations	Total impact to environmental justice populations would be limited by the structure of Clark County's economy, but any local spending lost may have some adverse affect on low income populations	Total impact to environmental justice populations would be limited by the structure of Clark County's economy, but any local spending lost may have some adverse affect on low income populations	No change in the current economic conditions, and would not have any impact on minority or low income populations	No change in the current economic conditions, and would not have any impact on minority or low income populations

Chapter 3 - Environmental Effects

The U.S. Sheep Experiment Station (Sheep Station) operates on Agricultural Research Service properties (ARS properties) that were set aside as a sheep-breeding and rangeland grazing research facility. As a research facility, our management is governed by research goals and objectives in support of the Sheep Station mission to develop integrated methods for increasing production efficiency of sheep and to simultaneously improve the sustainability of rangeland ecosystems. Because we are a research facility, the only standards that must be adhered to are those set forth in federal laws and regulations (i.e. Endangered Species Act; Executive Order 11990, Protection of Wetlands). The existing condition of that resource is used as the baseline for analysis of effects (see page 55). The existing condition of resources currently meets the needs of the Sheep Station to conduct its research.

For more detailed analysis of environmental effects can be found in the individual specialist reports in the project file, all of which are incorporated by reference for this analysis.

Dates photos were taken accompany the figure caption. To compare these dates with grazing, please see the grazing schedules in appendix B.

Activities Contributing to Cumulative Impacts

Cumulative effects are analyzed by resource, and cumulative effects boundaries in time and space are described by individual resource.

Other Lands Used by Sheep Station

Table 19 displays the allotments and feed lot that the Sheep Station uses as part of their research operation. See the Cooperating Agencies section (page 6) for descriptions of the allotments and the feedlot that the Sheep Station uses as part of their overall operations.

Table 19. Other lands utilized by the Sheep Station

USDA Forest Service (National Forest System)	Bureau of Land Management	Department of Energy
Meyers Creek (Island Park Ranger District)[a]	Bernice	Mud Lake Feedlot
East Beaver Creek (Dubois Ranger District)		
Snakey Canyon (Dubois Ranger District)		
Kelly Canyon (Dubois Ranger District)		

There are two reasons that these properties are included under the cumulative effects rather than the direct/indirect effects analyses

- The settlement agreement in *Center for Biological Diversity and Western Watersheds Project, v. U.S. Sheep Experiment Station; U.S. Department of Agriculture; Agricultural Research Service; and U.S. Forest Service* (2008) stipulated that:

1. The U.S. Agricultural Research Service shall prepare an "environmental assessment" ("EA") or "environmental impact statement" ("EIS"), pursuant to the National Environmental Policy Act ("NEPA"), regarding the grazing of sheep and related activities on U.S. Sheep Experiment Station lands.

In item 1 above, the stipulation was to prepare a NEPA analysis of grazing and related activities on "U.S. Sheep Experiment Station lands."

- Separate NEPA analyses were prepared by the respective agencies for Sheep Station use of those lands. It is neither required nor appropriate that the Sheep Station revisit these decisions.

In keeping with the settlement agreement direction and the existing NEPA analyses for the other agency parcels, this environmental impact statement analyzes the direct/indirect effects of the proposed actions on ARS properties only. The effects of grazing on the allotments and feed lot are therefore considered in the cumulative effects analyses.

Mountain States Transmission

Mountain States Transmission Intertie (MSTI) 500 kilovolt (kV) transmission line (http://www.msti500kv.com/projectdesign/projecttimeline.html; 09/01/2009)

North Western Energy (NWE) proposes to construct, operate and maintain the Mountain States Transmission Intertie (MSTI) 500 kilovolt (kV) transmission line to address the requests for transmission service from customers and to relieve constraints on the high-voltage transmission system in the region. The new transmission line would begin at the new Townsend Substation, which would be constructed in southwestern Montana about five miles south of the town of Townsend. The line would proceed south into southeastern Idaho connecting to Idaho Power Company's (IPCO) existing Midpoint Substation, 10 miles north of Jerome, Idaho (see Figure 24). The preferred route would cross Headquarters property and the East Beaver Forest Service allotment (see Figure 25). The expected decision date remains to be determined.

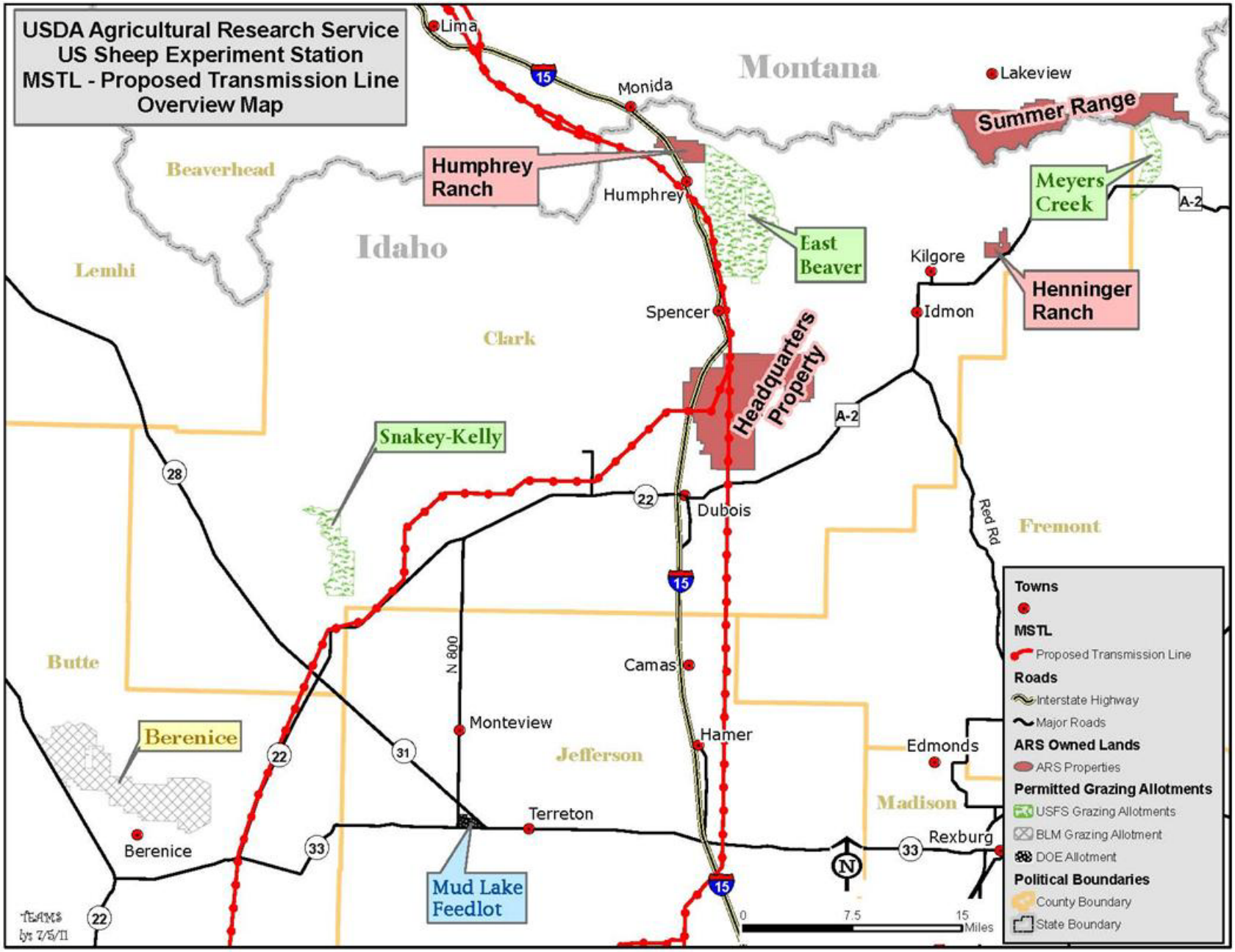

Figure 24. Mountain States Transmission Intertie (MSTI) 500 kilovolt (kV) transmission line alternative routes

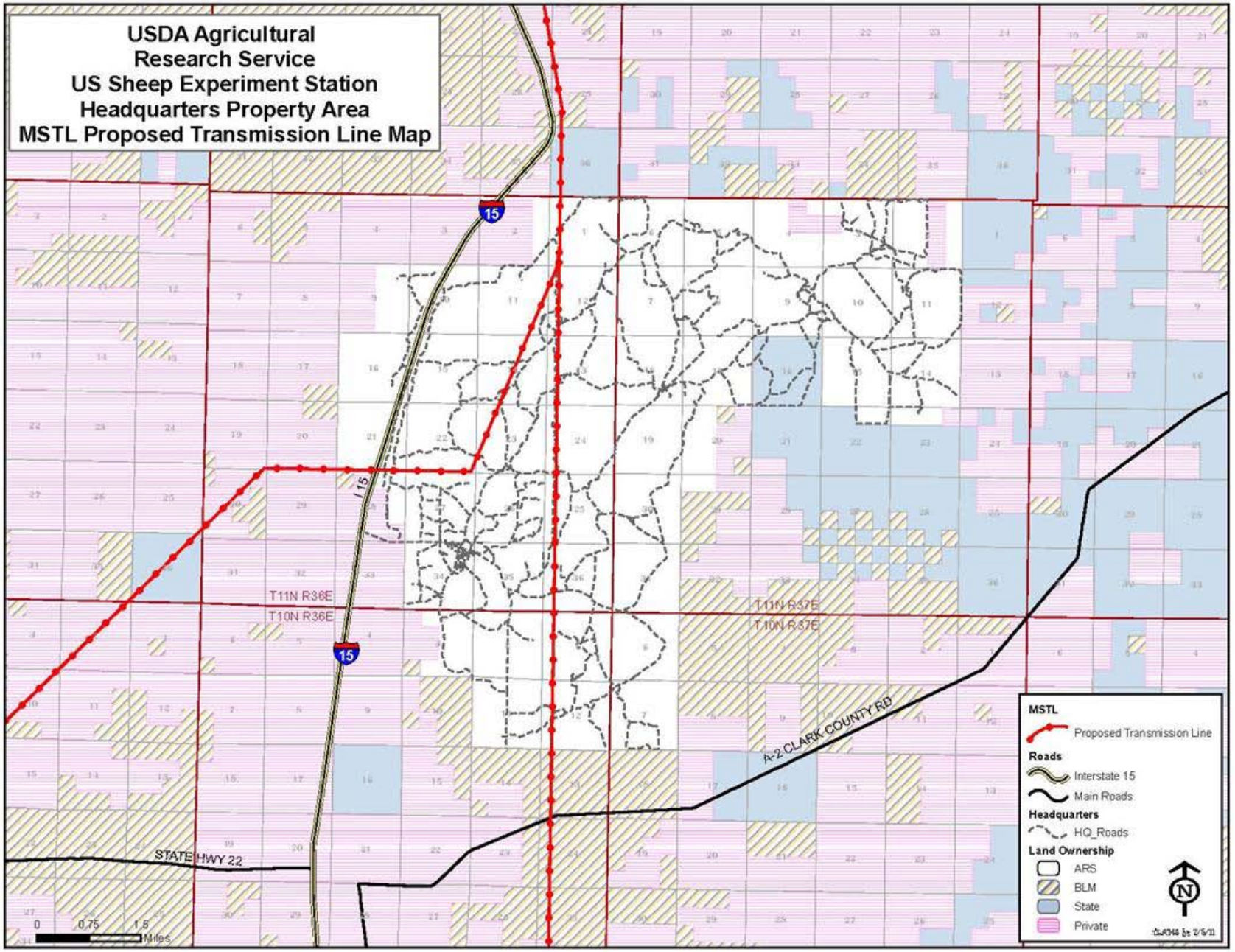

Figure 25. Mountain States Transmission Intertie (MSTI) 500 kilovolt (kV) transmission line preferred route as it crosses the Sheep Station

Climate Change

Climate changes at national or regional levels will influence changes at smaller levels, such as a site-specific project area. Site-specific influences will be greatly modified by topography, elevation, aspect, local airflow patterns, vertical mixing and transport, lapse rates and the tendency for inversions to form (Furniss et al. 2010). Most modeling is done at these gross scales (global, national or regional). Site-specific management activities are typically conducted at a much smaller scale, somewhere between 0.4 and 193 square miles, and there are problems with application of model results due to numerous factors not being accounted for or adequately considered at the proper scale (Furniss 2010, Salathe' et al. 2008). As a result, most models are not precise enough at this time to apply them to management activities at the project level. This limits the analysis of potential effects from climate change and the inter-relationship with proposed land management activities.

As a result, it is not possible to determine specific climate changes and how they would affect implementation of any of the proposed alternatives.

At this time there are no regulations to limit greenhouse gas emissions. Global climate change models are not yet able to resolve the specific impacts of greenhouse gases on local climate patterns. Any analyses of the impacts of this project on climate change, or vice versa, would be speculative and are therefore not included.

For the Greenhouse gasses emitted during prescribed burning, see Prescribed Burning section.

Physical Environment

The ARS properties are made up of low and highland areas along the northeastern edge of the Snake River Plain. The highlands serve as summer range and are located within the Centennial Mountains to the northeast of the Sheep Station. The lowlands are lava-dominated sage plains where the sheep are grazed fall through spring.

The Centennials are part of the Rocky Mountain province and consist of folded and thrusted sedimentary rocks overlain with basalt and tertiary sediments. Vegetation ranges from mixed conifer to alpine meadow communities. The Sheep Station has two summer ranges:

- West Summer - West Odell and Big Mountain grazing units, and
- East Summer - Toms Creek grazing unit

The lowlands are gently sloping lava flow bench lands made up of Quaternary aged lava flows over rhyolite tuffs. These lava flows have interfingered alluvial deposits from the Centennial Mountains, in addition to fine-grained sediments from wind-blown and lake deposits (Stevenson 1993 unpublished report, Link 2008). The Sheep Station's original Headquarters and the acquired old ranch Henninger are located on these lowlands with sage steppe as the dominant plant community. Another old ranch, Humphrey, borders these lowlands on the western foot slope of the Centennial Mountains, near Monida pass and is predominantly sagebrush.

This volcanic or lava plain, increases in elevation to the northeast and generates a strong moisture gradient from Headquarters to Henninger. Annual precipitation is in the range of 8-12 inches near the southwest corner of Headquarters and increases to 17-22 inches in the upper portion of Henninger, due to the orographic lift of the Centennial Mountains (Hiett 2009, personal communication). The Centennials

proper receive, on average, over 40 inches of precipitation annually primarily as snow (USDA NRCS 1991; Prism Model, USDA Forest Service 2009).

Predominately, moisture and temperature gradients drive vegetation and soil development, although parent material along with other soil forming factors are also very important as well in soil genesis, development and morphology. On the lowlands, the cold temperatures and arid conditions make for slow soil development, in part due to the relatively recent lava flow-rock. The inherent parent material properties of the lava and interbedded alluvium are factors in the formation of coarse to fine grained loamy soils, meaning they are well balanced in terms of their texture. In this area, soil forming factors lead to predominantly well-drained conditions, which may limit the water available to plants during the growing season. In addition, cold climatic conditions also limit vegetative types to those more adaptive species, especially in areas over 6,200 feet elevation where the with mean annual temperature is lower than 47 degrees F, which shortens the growing season and subsequent use and management of these soils. Headquarters, Henninger Ranch, the summer pastures with gentle slopes and northern aspects in the Centennials, and foothill Humphrey sites are all subject to these cold air influences (Hiett 2009, personal communication).

Resource Effects

The two resources most directly affected by the alternatives are range and wildlife and are detailed below. Following those are the analyses of effects to other resources. For the detailed analyses of effects, please refer to the specialist reports in the project file.

Range

For additional details of the rangeland affected environment, see the range report.

Range condition surveys on ARS properties were conducted in 2009, 1994, 1991, and 1989. Site condition and species composition studies have been conducted from 1924 to the present, resulting in 87 years of study (see Range Report). These studies and grazing effects studies indicate ecological sites are in good condition, functioning properly, with appropriate species composition.

Range Affected Environment

The U.S. Department of Agriculture (USDA), Agricultural Research Service, Sheep Station Headquarters is located in the upper Snake River plain at the foothills of the Centennial Mountains, in Clark County, about six miles north of Dubois, Idaho. Agricultural Research Service, USSES, Dubois station manages and grazes lands for research in Montana and Idaho. An overview of grazing areas is described below (also see Appendix A – Project Maps).

Headquarters Range, 27,930 acres of ARS property, includes office, laboratory, animal, equipment, and residential buildings, dry-lot facilities for research throughout the year, lambing facilities, and pastures used for spring and autumn grazing and rangeland research. Headquarters pastures are located in T11N, R36E, sections: 1, 11, 12, 13, 14, 16, 22, 23, 24, 25, 26, 27, 34, 35, 36; Part of sections: 2, 9, 10, 15, 17, 20, 21, 28, 33. T11N, R37E sections: 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19; Part of sections: 2, 3, 4, 11, 14, 20, 22, 23, 29, 30, 31. T10N, R36E, sections: 1, 2, 11, 12. T10N, R37E part of sections: 6, and 7.

West and East Summer Range grazing areas, 16,600 acres of ARS property, in the Centennial Mountains of Montana, are used for summer grazing and rangeland research. The West Summer Range is located in: T15S, R2W, unsurveyed Sections: 1, 2, 3, 4; Part of sections: 5, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23 T15SR1W sections: 4, 5, 6, 7; Part of sections 8, 9, 10, 18, 19. T14S, R1W Sections: Part of

sections 31, 32, 33, 34. The East Summer range is located in T14S, R1E: 34; Part of unsurveyed sections 25, 26, 27, 28, 32, 33, 35. T15S, R1E sections: Part of sections 1, 2, 3, 4, 5, 6.

Humphrey Ranch, 2,600 acres of ARS property north of Headquarters in Idaho, has animal facilities and equipment buildings, and is used for spring, summer, and autumn grazing and rangeland research, located in T14N, R36E: Part of sections 19, 20, 21, 22, 27, 28, 29

Henninger Ranch, 1,200 acres of ARS property near Kilgore, Idaho, has animal facilities and is used for summer, spring and fall grazing and rangeland research, located in T13N, R39E Section: 25 and Part of sections: 24, 36. T13N, R40E Sections: 19, 30.

Throughout the year, sheep utilize Bureau of Land Management, Forest Service, and Department of Energy (appendix A, Map 2) allotments. These lands will be included in this analysis as appropriate. However, use of these lands is covered under separate agreements with those agencies and will not be part of this decision.

Available AUMs, grazing dates and percent forage or AUMs used for each property are shown in Table 3.

Existing Condition

Headquarters Property (Figure 26)

The majority of Headquarters property rangelands are currently late mid seral. The 2009 field surveys indicate Headquarters rangelands have a higher percent of shrub cover than would occur with more frequent natural fire. More frequent burning would provide conditions for a higher percent of forb and grass cover.

Headquarters soils are stable, with desirable forb, shrub, and grass diversity. With rotational and deferred grazing and light stocking, utilization is none to slight (Table 3). Only small areas (sheep trailing, watering, bedding) less than 50 total acres, showed heavy use.

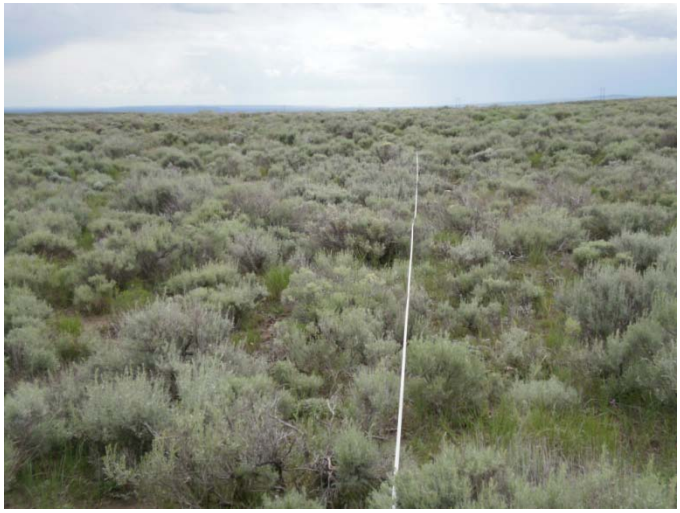

Figure 26. Headquarters pasture - (tg 08/09)

Yearly growing season rest across a majority of Headquarters property and the use of summer ranges is benefitting Headquarters, Humphrey and Henninger range resources by reducing amount of vegetation grazed during the growing season. Continued use of prescribed fire on Headquarters property rangelands improves forage by reducing sagebrush and increasing forbs and grass cover.

Cheatgrass was present on 38 Headquarters plots; a trace on 21 plots, 2 to 3 percent on 12 plots, 4 plots had 5 percent and one plot had 12 percent cheatgrass cover.

1994 Natural Resource Conservation Service Surveys

In 1994 the Natural Resource Conservation Service (NRCS) range conservationists conducted a field inventory on ARS Headquarters property to evaluate ecological status or range condition of the plant communities. Ecological status or range condition is the present state of vegetation on the ecological site

in relation to the climax or natural potential plant community for the site. The primary purpose of determining ecological condition is to provide a basis for predicting the extent and direction of change that can result in the plant community from specific vegetation treatments or management actions.

The range site ecological description represents the site's natural potential plant community. Range condition or ecological status represents the present plant community state. Vegetation treatments, grazing or other management actions can direct the plant community toward or away from the natural site potential (ecological site description). The 1994 inventory collected data on 162 study plots to established relative range conditions on nine natural potential plant communities (vegetation types) on the Headquarters property (NRCS 1995). The range site or ecological status determined one percent of the sites sampled were in excellent condition, 63 percent good condition, 31 percent fair condition and two percent in poor condition. Three percent were seeded (crested wheatgrass) and ecological status was not determined or rated for potential climax plant cover on these seeded areas. Headquarters administrative site and feedlots were not inventoried for ecological status.

During the inventory process apparent trend was estimated based on plant composition, presence of climax species seedlings, plant residue, plant vigor, and soil surface conditions. The 162 study plot data compiled indicated 32 percent of the sampled sites were in an upward trend, six percent were in a downward trend and 62 percent were static. Three percent of the stable static area was seeded.

Crested wheatgrass was present on 14 of the 162 plots, 10 of the 14 plots had a trace, one plot had 1 percent, one plot 2 percent, one plot 69 percent and one plot had 80 percent crested wheatgrass cover. The two plots with 69 percent and 80 percent crested wheatgrass cover were in planted areas and were not evaluated for ecological status.

1989 Headquarters Property Surveys

In 1989 a team of SCS (Soil Conservation Service, now NRCS) range conservationists conducted a field inventory on ARS US Sheep Experiment Station Headquarters property. Soil and range correlation and site condition inventories were conducted during the surveys. Frequency transects were established during this survey and read for the first time. Range site descriptions were revised or developed and peer reviewed in 1992. A complete plant species list was developed and plot locations mapped. Percent cover range was recorded for each grass and grass like species, forb species, shrubs and tree species, cryptogam (lichens and moss) group. Ecological site descriptions, used to evaluate existing conditions, were based on potential climax plant community. Evaluations included range site production (AUMs), stocking rates for excellent, good, fair and poor ratings and recommended grazing periods (NRCS 1991).

The 1989, plant communities site conditions, field inventory analysis determined present conditions for shallow loamy sites were predominantly good with one site excellent and four in fair condition. Loamy sites were predominantly good with two sites excellent and three in fair condition. Stony loam sites were predominantly good with one site in excellent condition. The ten shallow stony sites were rated ½ (five) good and ½ (five) fair condition, and loamy bottom sites were in good condition.

Henninger Ranch Pastures (Figure 27)

Figure 27. Henninger Ranch pasture - (tg 08/09)

Henninger Ranch pastures fair range condition appears to be static with a down ward trend on browse species, is recovering from past cattle grazing and early agricultural practices. Current grazing from June 25 through July 29 and again August 31 through September 15 are assisting with recovery.

Field surveys, done in 2009, found moderate to heavy browse species use. Use on some areas may be associated with early and late season deer and elk grazing.

Historically, the ranch primarily grazed cattle until purchased by ARS for the Sheep Station in the early 1940s. Smooth brome (*Bromus inermis*) presence in some pastures indicates that it was planted for cattle feed. Smooth brome is not preferred by sheep and could spread into native vegetation areas. The 2009 line intercept field survey data recorded smooth brome cover, 3.6 percent on study plot HE9, 22 percent on HE11 and 1.2 percent on HE11B.

Seeding

A successful seeding at Henninger was first done on about 30 acres in the West Meadow on October 22 and 23, 1981. The second no-till seeding on 35 acres, in East Meadow in 1986 failed. The same area was plowed in the fall of 1989 and successfully seeded to alfalfa, clover, brome and timothy in the spring of 1990.

Humphrey Ranch Pastures (Figure 28)

The Humphrey Ranch rangeland is thriving in an early mid seral state. This site is very stable with desirable forb, shrub, and grass diversity. Fire has historically occurred on this property at 20 to 50 year intervals. Part of Humphrey ranch burned in the last 20 years.

Utilization is light with rams and small groups of sheep grazed here. Rotational and deferred grazing with light stocking rates have allowed for good range conditions with a static or slight upward trend. Only small areas, less than 50 total acres, where sheep are trailed, watered and/bedded showed heavy use.

Figure 28. Humphrey Ranch pasture - (tg 08/09)

In the 2009 range survey, species composition by percent cover was recorded for each line transect site and is included in the 2009 Rangeland Assessment Report (Grooms 2009).

East Summer and West Summer Ranges (Figure 29)

The Sheep Station summer ranges have a high diversity of forbs, grasses, and shrubs.

Figure 29. East Summer and West Summer range - (cj 08/09)

Sheep grazing is done during the summer, and is rotated between East Summer Range (Toms Creek) and West Summer Range (Big Mountain and Odell) grazing units with each pasture rested one year in three. Recent fall fires on Agricultural Research Service properties favor forb growth. Above average precipitation, and below average temperatures in 2009 provided high forb production. Exclosures in East and West Summer Ranges showed no visual difference in composition, vigor, or production over grazed areas. This finding is consistent with Klement's 1997 assessment. All sampled components were similar both inside and outside of exclosures. Figure 30 to Figure 32 display grazing effects at fence-line at sheep exclosure in West Summer Range (Odell).

Figure 30. Fence-line along sheep exclosure

Figure 31. Same location away from exclosure

Figure 32. Same location inside exclosure - West Summer Odell Unit (grazed area) - (cj 08/09)

Figure 33. Driveway bottleneck West Summer - (cj 08/09)

Figure 33, West Summer – Big Mountain, shows the sheep driveway where some exposed soil is evident. Impacts to areas subject to concentrated localized activity such as the driveways, are mitigated by rest one in three years, and are considered short-term impacts. There is vigorous willow growth protecting the intermittent stream course at the toe of the slope (Figure 33). Driveway impacts are not characteristic of East and West Summer Range, or grazing units within them, where light stocking grazing is spread across the large landscape with minimal effects. Rotational and deferred grazing (rest one in three years); zero to slight utilization and light stocking (Table 3); adaptive management; and best management practices have resulted in good range condition and slightly upward trend.

Visual review of the grazed pastures during 2009 field surveys supports Sheep Station grazing records (Table 3) well below accepted utilization standards.

Sheep grazing effects visually contrast with cattle use. Sheep are continually herded as they graze in tight patterns across the landscape. This, coupled with herd size, (approximately 900) can result in as much tramping of vegetation as grazing (Figure 34 to Figure 36).

Figure 34. West Summer Range, Odell. Upslope -Left side is ungrazed while right demonstrates herd grazing

Figure 35. West Summer Range, Odell. Down-slope – Note ungrazed areas bordering grazed/herded area

Figure 36. Grazed area exhibits minimal exposed soil and excellent residual litter - (cj 08/09)

A comment received during Scoping indicated that the head of Toms Creek is a concern. Current condition is related to the harsh site (soil/aspect/slope/elevation), severe wildfire less than 50 years ago, and past grazing, all combined to slow site recovery. Bare soil and lack of plants is not tied to current grazing. Figure 37 and Figure 38 display the existing conditions for the area of concern in Toms Creek that was noted in the Scoping comments. A diversity of plants and good production indicate that this area is recovering.

Figure 37. Below area of concern Toms Creek. – 8/09

Figure 38. Area of concern Toms Creek – 8/09

Range surveys were collected and analyzed on the Centennial Mountains Summer Range in 1959, 1978, and 1994 on 61 sites including tall forb, sagebrush, grass and open conifer vegetation types. Eight exclosures were also sampled in the same vegetative types. Results from both studies indicate improved or static range conditions (Klement 1997). Tall forb and open conifer vegetation types showed the most increase in perennial forb composition indicating succession toward a tall forb climax condition. Grass composition declined with the increased composition of perennial forbs. Plant cover remained static or increased, except for a 10 percent decline in the tall forb vegetation type. All sample components were similar both inside and outside exclosures (Klement 1997). The focus of Klement's 1997 (three year) study was to determine trends from ground cover conditions, species composition, and biomass in tall forb, open conifer, and grass vegetation types. In 1989 rotational and deferred grazing systems were implemented. Light stocking rates now use 6.25 percent of available forage, this has allowed seral sites to improve since 1959 (Klements 1997). Three exclosures were established in 1960, five were added in 1978, after 14 years very little change was evident inside or outside exclosures. With light stocking, deferred and rotational grazing, any difference between vegetation species composition, ground cover or other differences were not an effect of grazing (Klement 1997).

In 1994, 25 perennial tall forb community sites were sampled, including three with grazing exclosures. These vegetation types (noted above) were also surveyed in 1959, 1978, 1979 and 1994. In 2008 Klement and Moffet tested the hypotheses that site conditions such as biomass, taxonomic composition and richness, cover, bare ground and gopher mounding were constant among years and between levels of

grazing on the grazed and ungrazed areas surveyed in 1959, 1978, and 1994. Results indicate sheep on Sheep Station summer range had no effect on subalpine tall forb vegetation communities. Between 1964 and 1994 grazing had been light with less than 11 percent of available forage used. Analysis results indicated no difference or shift between perennial tall forb to grass for either plant community either inside or outside exclosures (Klement and Moffet 2008).

In 1991 a team of SCS range conservationists conducted a field inventory on Sheep Station Summer Range property to evaluate ecological status of the plant communities. Ecological status or range condition is the present state of the vegetation of the ecological site in relation to the climax or natural potential plant community for the site. The primary purpose of determining ecological condition is to provide a basis for predicting the extent and direction of change that can result in the plant community from specific vegetation treatments or management actions.

Summer range grazing areas were type mapped for each natural climax plant community. Major factors affecting natural plant communities include soil, climate, aspect, slope, and other environmental conditions that result in specific range production. Each range site is described on the bases of the climax or natural potential plant community it is capable of supporting. Each ecological site was inventoried and percent cover range was recorded for each grass and grass like species, forb species, shrubs and tree species, lichens and moss groups. Site descriptions included a discussion of what plants would be expected to increase or decrease with prolong degradation from over grazing that can be compared to existing low use favorable conditions.

The range site or ecological site description represents the site's natural potential plant community. Range condition or ecological status represents the present plant community status. Vegetation treatments, grazing or other management actions can direct the plant community toward or away from the natural site potential (compared to ecological site description). The 1991 inventory collected data to established relative range conditions on eight natural potential plant communities (range site descriptions). Data was compiled and peer reviewed in 1992 (USDA NRCS 1992). The range site condition or ecological status was determined from field inventory worksheets for the following ecological sites:

- South Slope Gravelly range site, good condition
- Mountain Meadow Loamy range site, good condition with one site description area in excellent condition
- Windswept Mountain Ridge site, good condition
- Mountain Meadow Semi-wet range site, excellent condition
- Mountain South Slope range site, predominantly in good condition with one site description area in fair condition
- Steep Mountain Slope range site, predominantly in excellent condition with two site description areas in good condition and one site description area in fair condition
- Mountain Slope range site, predominantly in good condition with one site description area in excellent condition
- Riparian Wet Meadow range site was in excellent condition

Analysis Methodology

Short-term effects represent impacts that occur year to year, or for this analysis, across a time-span of up to five years. Long-term effects for this analysis represent resource impacts that occur across timeframes for five years or more. Direct and indirect grazing effects are discussed for ARS properties.

The 2009 Rangeland Assessment (Grooms 2009) evaluated and assessed Headquarters, Henninger, Humphrey, and East and West Summer Ranges using an interdisciplinary team consisting of rangeland management specialists, a wildlife biologist, a soil scientist, and a hydrologist. Documents and publications used in the assessment process include the *Soil Survey of Grant and Freemont County, Idaho* (USDA NRCS 1999), *Ecological Site Descriptions for Major Land Resource Area Bllb, Blla, B13* (USDA NRCS 1982) *Interpreting Indicators of Rangeland Health* (USDI BLM et al. 2000), *Sampling Vegetation Attributes* (USDI BLM et al. 1996), and the *National Range and Pasture Handbook* (USDA NRCS 1997). The line intercept method used to obtain data consists of a horizontal, linear measurement of plant intercepts along the course of a line (tape). It is designed for measuring grass or grass-like plants, forbs, shrubs, and trees. The line point intercept method measures vegetation along a given distance and from those measurements plant composition is determined.

The Rangeland Assessment Report and associated project file are incorporated by reference for this analysis.

Potential effects of the proposed management activities by alternative are evaluated using the following criteria:

- There are no federal laws and regulations applicable to grazing ARS Sheep Station properties. The existing condition is considered the baseline for comparison of alternatives.
- Proposed management activities have been evaluated using vegetation condition, forage utilization, and management or operations flexibility.
- Cattle and horse forage use and other grazing direct, indirect and cumulative effects are included in survey data analysis for ecological site status, rangeland condition and trend rating.
- Range site is a distinct rangeland, in absence of abnormal disturbance and physical site deterioration, has the potential to support a distinct native plant community with associated species, different from that of other sites (Holechek 1989). Range condition ratings based on climax species percent cover are: excellent, 76 to 100; good, 51 to 75; fair, 26 to 50; poor, 0 to 25.
- For this analysis range site condition can be rated: excellent, good, fair, or poor, site trend can be rated: up, down or static. Range condition is generally defined as departure from potential site productivity. Trend is the direction of change in range condition.
- Forage utilization (Table 20) is defined as amount of current year vegetation production grazed at the end of the grazing season. Percentage figures apply to current year's growth of key forage species on a site.

Table 20. Utilization

Level of Use	Percentage of grazed
None to Slight	0 to 10%
Light	10 to 30%
Moderate	30 to 50%
Heavy	Greater than 50 %

Flexibility and adaptive management is defined as flexibility in management options for where, when, and how long sheep graze a range. Increased options (where/when/duration) increase ability to practice adaptive management. Flexibility could be: no

flexibility - poorly adaptive; some flexibility - moderately adaptive; or maximum flexibility - highly adaptive.

Rangeland condition is a function of rangeland forage: condition, trend and utilization. The focus of the analysis of effects to the rangeland resource is on browse and forbs, which are the primary forage types used by sheep. Effects to these forage types determine long-term sustainability of the rangeland resource, and are a key factor for effects analysis.

Spatial and Temporal Context for the Effects Analysis

The spatial boundary for range effects analysis is all ARS properties. Cumulative effects analysis includes ARS properties and allotments under MOUs (USDA Forest Service and BLM allotments, DOE feedlot) used for grazing throughout each year. The temporal boundary will represent resource impacts that occur across timeframes of five or more years. The five-year or more timeframe allows for yearly fluctuations while being an appropriate timeframe to identify range condition and trend.

Direct and Indirect Effects

Alternative descriptions below display the differences among alternatives 2 to 5 and the proposed action (alternative 1). Table 21 displays the ARS properties or allotments where grazing would or would not occur under alternatives 1 to 5. When not grazing, sheep are maintained at the Mud Lake feedlot.

Table 21. Grazing properties by alternative

Properties	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
ARS properties					
Headquarters	Grazing	No Grazing	Grazing	Grazing	Grazing
Humphrey	Grazing	No Grazing	No Grazing	Grazing	Grazing
Henninger	Grazing	No Grazing	Grazing	Grazing	Grazing
Summer East	Grazing	No Grazing	No Grazing	No Grazing	Grazing
Summer West	Grazing	No Grazing	No Grazing	Grazing	Grazing
Allotments under MOUs (DOE, USDA-FS, DOI-BLM)					
Mud Lake Feed Lot	Grazing	Grazing	Grazing	Grazing	Grazing
Snakey-Kelly	Grazing	No Grazing	Grazing	Grazing	No Grazing
East Beaver	Grazing	No Grazing	No Grazing	Grazing	Grazing
Meyers Creek	Grazing	No Grazing	No Grazing	No Grazing	Grazing
Bernice	Grazing	No Grazing	Grazing	Grazing	No Grazing

With the low AUM use on all alternatives, short-term sheep grazing and related operations effects of any alternative, if implemented, would not adversely affect long-term site productivity.

Alternative 1 - Proposed Action (No New Federal Action)

Direct and Indirect Effects

Alternative 1, the proposed action would continue sheep grazing and associated activities that have been historically occurring in conjunction with Sheep Station research to develop integrated methods for increasing production efficiency of sheep and to simultaneously improve the sustainability of rangeland ecosystems. These activities enable the Sheep Station to carry out the mission for which it was established by executive order and public law.

The proposed action is also considered the no action alternative, because no new federal actions are proposed, this action is a continuation of historic and existing activities already occurring on the ARS properties.

Headquarters

Continued current grazing would have little effect on this range. Based on available data, there is little or no difference between grazed and ungrazed areas now and little room for improvement. Rotational and deferred grazing with light stocking rates would continue to maintain fair range conditions with a static trend. Current seasonal use would continue to provide growing season deferment across the majority of the Headquarters property each year and provide its natural ecological function to continue. Stable soils would continue with desirable forb, shrub, and grass diversity. Only small (less than 50 acres) areas representing less than one percent of Headquarters grazing area (trailing/watering/bedding) would continue to show heavy use.

Associated activities (prescribed burning, seeding, noxious weed control, fence maintenance, cattle and horse grazing, stock watering) would continue. These activities would contribute to good range condition. Prescribed burning would continue to reduce shrub (sagebrush, *Artemesia* ssp) cover. Continued sheep grazing and spot herbicide application would control noxious weeds. Cattle and horse grazing during the non-growing season would continue removing last-season grass growth. Forage removal with infrequent light stocking of cattle and horse grazing would contribute to grass growth. Fence maintenance would continue to control sheep grazing within units and prevent livestock trespass. Stock watering would continue to move sheep by varying water sites to little-used areas. Road maintenance would continue to provide efficient management access.

Humphrey Ranch

Continuing current grazing would have little effect on this range. Based on 2009 range surveys there is little or no difference between grazed and ungrazed areas, with little room for improvement. Rotational and deferred grazing with light stocking rates would maintain fair range conditions with a static trend. Very stable soil conditions would continue with a desirable forb, shrub, and grass diversity. Light stocking with less than 400 rams and 200 ewes would continue. Only small (less than 20 total acres) areas representing less than one percent of Humphrey property (trailing, watering, bedding) would continue to show heavy use.

Ongoing associated activities, seeding, noxious weed control, fence maintenance, cattle and horse grazing, would contribute to good range condition. Weeds are not a problem and weed control with sheep grazing and spot herbicide application would continue to keep weeds in check. Cattle and horse grazing during the non-growing season would continue when needed to remove last-season grass growth and dormant vegetation to enhance forage production. Fence maintenance would continue to control sheep grazing within units and prevent livestock trespass.

Henninger Ranch

Soils are stable; utilization is light on forbs and grass with diverse forbs, shrubs, and grasses and fair range condition. The 2009 field surveys found moderate to heavy shrub use with a downward trend on browse species. Early and late season deer and elk grazing contribute to forage use. The ranch primarily grazed cattle up until purchased by the Sheep Station in the early 1940s. Smooth brome (*Bromus inermis*) in some pastures indicates that it was planted for cattle feed. Smooth brome is not preferred by sheep and could spread into native vegetation areas. The 2009 line intercept field survey found 3.6 percent smooth brome cover, on study site HE9, 22 percent on HE11 and 1.2 percent on HE11B.

Only small bedding (less than 10 total acres) areas representing less than two percent of the area grazed showed heavy use. Season of use is June 25 to July 9 and August 31 to September 15.

Associated activities (noxious weed control, fence maintenance, seeding, predator mitigation measures) would continue. Effects would be the same as for Humphrey Ranch noted above.

East Summer Range (Toms Creek)

Continued current grazing would have little effect on East Summer range. There is little or no difference between grazed and ungrazed areas now and little room for improvement. Light forage use and good range conditions with static or slight upward trend would continue. Soils would continue to be stable with a desirable forb, shrub, and grass diversity. Light stocking, rotation and rest one year in three have maintained good range conditions with a continued stable or upward trend. A comparison of exclosures that have not been grazed in 30 to 50 years to areas outside exclosures, showed no differences in plant species composition. Forb production in 2009 was high and would be expected to continue with current stocking. Only small (less than 50 total acres) areas (sheep driveways, trailing, watering, bedding), representing less than one percent of East Summer Range, showed heavy use and this would continue under current grazing practices.

Driveway maintenance would continue to facilitate moving sheep to graze underutilized areas.

West Summer Range (Odell/Big Mountain)

Continued current grazing would have little effect on this range. There is little or no difference between grazed and ungrazed areas now and little room for improvement. Light forage utilization and good range conditions with static or slight upward trend would continue. Stable soil conditions would continue with diverse forb, shrub, and grass composition. Rotational grazing and rest one year in three with light stocking have developed good range conditions with a stable or upward trend that would continue. Small heavy use (less than 50 total acres) areas (sheep driveways, trailing, watering, bedding), representing less than one percent of West Summer range would continue.

Alternative 1 - Summary Range Direct/Indirect Effects

Table 22 displays available forage AUMs, AUMs used, percent of available forage used, grazing period used during the year and number of days grazed by property.

Table 22. Alternative 1 – percent of forage used, grazing period and grazing days by property

Property	Available Forage AUMs[a]	AUMs Used[a]	Percent of Available Forage Used	Inclusive Grazing Period	Approximate Grazing Days[b]
Headquarters	28,353	1598	5.6	April 23 – June 25	86
				Sept 1 – Nov 1	61
Humphrey	4,476	603	13.5	June 1 – Oct 20	142
Henninger	1,914	455	23.8	June 25 – July 9	15
				Aug 31 – Sept 15	16
East Summer[c]	4,043	155	3.8	July 3 – Aug 31	60
West Summer[c]	9,881	500	5.1	July 9 – Aug 31	54

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep are equivalent to one (1) AUM.
b - Depending on weather conditions and day of the work week, these dates may shift ± 7 days.
c - East and West Summer Ranges would be rest rotation grazed two years out of three.

Alternative 1 would continue to provide range conditions necessary for the Sheep Station to continue its mission of current and ongoing research.

Alternative 2 (No grazing ARS U.S. Sheep Experiment Station Properties and Bureau of Land Management/ Forest Service Allotments)

Direct and Indirect Effects

Alternative 2 was developed in response to the public suggestion that sheep grazing be eliminated completely from the ARS properties and BLM and FS allotments. This would result in a 65 percent reduction of sheep inventory from alternative 1 with 1,166 sheep retained for research purposes. Retained sheep would be maintained at Mud Lake Feedlot where harvested feeds would be fed daily to meet nutrient needs. About 130 sheep would graze the lands surrounding Mud Lake Feedlot from April to September.

Table 23 displays available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year and number of days grazed by property.

Table 23. Alternative 2 - projected annual AUM utilization on each property with approximate grazing dates

Properties	AUM Available	AUM Utilized	Utilization %	Approximate grazing dates	Approximate Grazing Days
ARS properties	**48,667**	**0**	**0**	**N/A**	**N/A**
Headquarters	28,353	0	0	N/A	N/A
Humphrey	4,476	0	0	N/A	N/A
Henninger	1,914	0	0	N/A	N/A
East Summer (Toms Cr.)	4,043	0	0	N/A	N/A
West Summer (Odell Cr./Big Mt.)	9,881	0	0	N/A	N/A
Allotments under MOUs (DOE, USDA-FS, DOI-BLM)	**26,087**	**158**	**0.6**		
Mud Lake	560	158	28.2	4/1 – 9/ 20	173
Snakey-Kelly	1,756	0	0	N/A	N/A
East Beaver	17,887	0	0	N/A	N/A
Meyers Creek	3,076	0	0	N/A	N/A
Bernice	2,808	0	0	N/A	N/A

Forage use on DOE property would be well within accepted standards.

Headquarters, Humphrey, East Summer, West Summer

Ending grazing would have little effect on these range properties. Based on available data, there is little or no difference between the grazed and ungrazed areas now and little room for improvement. Alternative 2 would maintain satisfactory range conditions. The small disturbed areas of past grazing effects would recover at natural rates. This would include those areas of heavy use identified under alternative 1. Range vegetation condition of fair with static trend would be met. Existing infrastructure (water developments, troughs, fences, etc.) would not be maintained. Prescribed burning would not be done to retain fire as an ecological process on the landscape (Headquarters) and invasive plants control would not continue.

Ending grazing across all ARS properties would eliminate localized and short-term grazing effects on sheep driveways, watering sites, and bedding grounds. No grazing would allow late-seral species to

increase and maintain dominance in herbaceous vegetation types. Preferred forage species would not be harvested by sheep.

With current sheep grazing, invasive weeds are not a problem although small patches of noxious weeds do exist on these properties. Adjacent rangelands have more extensive weed infestations. Weed control (grazing and spot herbicide application) would not continue, and this could result in increasing weed populations. Fence maintenance on the Headquarters and Humphrey properties would not continue.

Long term effects of alternative 2 on current ARS properties would depend on what the properties would be used for after sheep grazing for research was terminated.

Henninger Ranch

Residual effects from sheep grazing would recover at natural rates. This would include areas of heavy use identified under alternative 1. Range vegetation condition would probably move to fair with an upward trend. Invasive weed control and fence maintenance would not continue. Smooth brome (non-native grass) would remain on site and could replace some native species. Long term effects on this historic ranch land would depend on what (undetermined actions) the property would be used for after sheep grazing for research was terminated.

Alternative 2 - Summary Range Direct/Indirect Effects

No grazing on Headquarters property, Henninger and Humphrey Ranches and East and West Summer Ranges would not provide range conditions necessary for the Sheep Station to continue its current and ongoing research mission.

Alternative 3 (No grazing ARS U.S. Sheep Experiment Station Humphrey Ranch, East and West Summer Ranges)

Direct /Indirect Effects

Alternative 3 was developed in response to the public scoping suggestion that grazing be eliminated in the Centennial Mountains. Under alternative 3, ARS properties Humphrey, East Summer, and West Summer, and USDA Forest Service Meyers Creek and East Beaver allotments would not be grazed. AUMs used are based on 2,665 sheep, a 20 percent reduction from alternative 1 inventory, retained for research purposes. Reduced sheep numbers in alternative 3 are based on available forage (AUMs) on Headquarters and Henninger properties and Snakey-Kelly and Bernice allotments. Although much of the forage would be provided by increased use on Headquarters property (5.6 percent on alternative 1 increased to 9.1 percent on alternative 3) forage use is well within acceptable standards and would provide desirable range conditions. Forage use on Henninger would be reduced from 23.8 percent in alternative 1 to 15.5 percent of available AUMs under alternative 3 with expected improved range conditions.

Table 24 displays alternative 3 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Table 24. Alternative 3 general sheep grazing schedule

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Properties
Early Jan – Mid Jan	1680 sheep at Bernice	No
	980sheep at Mud Lake	No
Mid-Late January - Late April to Early May	Sheep are maintained at the Mud Lake feedlot facility under agreement with DOE and in the feedlot facilities at Sheep Station headquarters (this is where the lambs are born during this period of the year)	Yes / No
	2660 sheep	
Late April to Early May	2660 Sheep are turned out onto Sheep Station headquarters pastures in Idaho	Yes
	2660 sheep	
Late April - Late May	2660 sheep Grazing on Sheep Station headquarters pastures in Idaho – 2660 sheep	Yes
Early June – Early Oct	2660 The sheep are moved from Sheep Station headquarters pastures in Idaho to the Henninger Ranch property in Idaho[a]	Yes
	2320 sheep graze at Henninger	Yes
	340 Rams graze at Henninger	Yes
Early- Mid Oct	2500 sheep moved from Henninger to HDQ	Yes
	160 sheep (rams) continue grazing at Henninger	Yes
Mid Oct – Lat Oct	1500 sheep moved to feed lots at Mud Lake and HDQ	No
	1160 sheep graze at HDQ	Yes
Early Nov	2500 sheep moved to Mud Lake feedlots	No
	160 sheep remain, graze, at HDQ	Yes
Mid Nov	1700 sheep at Mud Lake feedlots	No
	800 moved to Snakey, FS allotment	No
	160 sheep graze (weather permitting) at HDQ	Yes
Late Nov – Mid Dec	960 sheep at Mud Lake feedlots	No
	800 sheep at Snakey allotment[b]	No
	900 sheep at Kelly allotment[c]	
Mid Dec – Mid Jan[f]	960 sheep at Mud Lake feedlots[e]	No
	1680 sheep at Bernice BLM allotment[d]	

a - Rams are not with ewes and lambs (used 2300 ewes and about 340 rams, this number is not exact and varies from year to year)

b - Snakey has 1200 sheep permitted for the allotment, Nov 6 to Jan 2, dates move out of Snakey/Kelly is based on weather conditions, if there is early snow accumulation move out dates area earlier than permitted dates. Sheep would always be moved out of Snakey on or before January 12 and always moved out of Kelly on or before January 13. From Snakey and Kelly sheep re moved to BLM Bernice allotment.

c - Kelly has 1000 sheep permitted for the allotment, Nov 20 to Jan 3. From Kelly sheep are moved to BLM Bernice allotment.

d - Bernice has 1050 sheep permitted for the allotment, Nov 23 to Feb 1, and 1050 sheep permitted for the allotment, Dec 06 to Feb 5, - from Bernice sheep are moved back to Mud Lake, then Back to HDQ.

e – 400 Rams and 800 ewe lambs are retained at Mud Lake when 2100 sheep are moved in mid November to graze at FS and BLM allotments

f- Move date from Bernice to Mud Lake depends on snow conditions, early snow requires moving earlier than early Feb.

Table 25 displays alternative 3 available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days grazed by property.

Table 25. Alternative 3 - projected annual AUM utilization on each property with approximate grazing dates

Properties	AUM Available	AUM Utilized	Utilization %	Approximate grazing dates	Approximate Grazing Days
ARS properties	**48,667**	**2,873**	**5.9**		
Headquarters	28,353	2,577	9.1	April 23 – November 1	193
Humphrey	4,476	0	-	N/A	N/A
Henninger	1,914	296	15.5	June 1 – October 20	142
Summer East (Toms Cr.)	4,043	0	-	N/A	N/A
Summer West (Odell Cr./Big Mt.)	9,881	0	-	N/A	N/A
Allotments under MOUs (DOE, USDA-FS, DOI-BLM)	**26,087**	**1,015**	**3.9**		
Mud Lake	560	158	28.2	April 1 – June 15	76
Snakey-Kelly	1,756	337	19.2	November 8 – December 15	38
East Beaver	17,887	0	-	NA	N/A
Meyers Creek	3,076	0	-	NA	N/A
Bernice	2,808	520	18.5	December 15 – February 5	53

Headquarters

Light stocking would increase to moderate with an estimated utilization almost doubling alternative 1. However, with 9.1 percent of available AUMs used under alternative 3, forage utilization would remain light. Growing season deferment provided under alternative 1 (June 25 – September 1) would be lost. Grazing would affectively move from before and after the growing season to during the growing season. Continued growing season use could affect plant composition and vigor, less desirable plants may increase. Use of sheep-preferred browse species and forbs would increase from 6.8 percent to 9.1 percent.

Associated activities (prescribed burning, seeding, noxious weed control, fence maintenance, cattle and horse grazing, predator avoidance and abatement) would continue, but with higher use under alternative 3, may be less effective than in alternative 1. Prescribed burning that currently contributes to keeping shrub densities from increasing could be implemented with adjustment in pasture grazing schedules. Grasses and forbs would decrease as shrub (sagebrush) densities increase, this species composition shift would be offset with continued prescribed burning described under operations. Noxious weed control would continue. With removal of additional vegetation by sheep, plant and litter cover would decrease. Cattle and horse grazing during the non-growing season could be done for a shorter period with less available forage. Fence maintenance would continue to facilitate sheep grazing within units.

Henninger Ranch

Forage use would be reduced from 23.8 percent in alternative 1 to 15.5 in alternative 3. Deferred grazing during the growing season provided under alternative 1 (July 9 – August 31) would be lost and could affect species diversity. Smooth brome could spread to new areas. Noxious weeds, in small patches and at sheep handling facilities would be controlled. Fence maintenance would continue.

Humphrey Ranch, East Summer and West Summer Ranges

Same as alternative 2.

Alternative 3 - Summary Range Direct/Indirect Effects

No sheep grazing and associated activities on Humphrey Ranch and the East and West Summer Ranges would have some beneficial effects on range conditions discussed under alternative 1. However, without grazing on Humphrey Ranch and East and West Summer Ranges, the Sheep Station would be unable to continue its current and ongoing research mission.

Alternative 4 (No Grazing East Summer Range, Meyers Creek Allotment)

Direct /Indirect Effects

Alternative 4 was developed in response to the public scoping suggestion that grazing be eliminated adjacent and within in the grizzly bear primary conservation area (PCA). Under alternative 4, ARS East Summer Range and USDA-FS Meyers Creek allotment would not be grazed. AUMs used and number of sheep retained for research are based on a 10-year average sheep inventory with a high of 3,331 head. The majority of AUMs needed to replace AUMs eliminated on East Summer Range would be provided from West Summer Range.

Table 26 displays alternative 4 available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days grazed by property.

Table 26. Alternative 4 - projected annual AUM utilization on each property with approximate use dates

Properties	AUM Available	AUM Utilized	Utilization, %	Approximate grazing dates	Approximate Grazing Days
ARS properties	**48,667**	**3,382**	**7.0**		**-**
Headquarters	28,353	1,598	5.6	April 23 – June 25; Sept 1-November 1	147
Humphrey	4,476	603	13.5	June 1 – October 20	142
Henninger	1,914	470	24.6	June 25 – July 9; August 31 – September 15	32
East Summer (Toms Cr.)	4,043	0	0	N/A	N/A
West Summer (Odell Cr./Big Mt.)	9,881	711	7.2	July 9 – August 31	54
Allotments under MOUs (DOE, USDA-FS, DOI-BLM)	**26,087**	**1,445**	**5.5**		**-**
Mud Lake	560	160	28.6	April 1 – June 1	62
Snakey-Kelly	1,756	421	24.0	November 8 – December 15	45
East Beaver	17,887	213	1.2	July 3 – September 1	61
Meyers Creek	3,076	0	0	NA	N/A
Bernice	2,808	650	23.2	December 15 – February 5	53

Forage use would be well within accepted standards to maintain healthy range conditions.

Headquarters, Humphrey and Henninger Ranches

Same effects as alternative 1.

Table 27. Alternative 4 general sheep grazing schedule

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Properties
Mid-Late January - Late April to Early May	3300 Sheep are maintained at the Mud Lake feedlot facility under agreement from DOE and in the feedlot facilities at USSES headquarters (this is where the lambs are born during this period of the year)	Yes / No
Late April to Early May	3300 Sheep moved to Sheep Station headquarters pastures in Idaho	Yes
Late April to Early May - Late June	3300 sheep graze on Sheep Station headquarters pastures in Idaho	Yes
Early June – Early Sept	650 sheep moved from HDQ to Humphrey Ranch	Yes
Early July – Early Sept	650 sheep moved from HDQ to East Beaver	No
Late June - Early July	2000 sheep moved from HDQ to Henninger [a]	Yes
Early July - Labor Day	2000 Sheep herded from the Henninger Ranch to summer grazing in the Odell Creek and Big Mountain grazing units of Sheep Station lands in Montana.	Yes/no
	1000 sheep at Odell and 1000 sheep at Big Mt, no rest rotation	
	650 sheep moved from HDQ to graze at E. Beaver; 650 sheep continue grazing at Humphrey (1300 sheep, includes 400 rams at Humphrey)	
Early Sept – Mid Sept	2000 sheep moved to Henninger from W Summer Range	
	650 sheep moved from E Beaver to HDQ	
Mid Sept – Mid Oct	2000 sheep moved from Henninger to HDQ	
	250 sheep moved from Humphrey to HDQ	
Mid Sept - Mid Oct	2900Sheep return to graze at Sheep Station headquarters pastures in Idaho	Yes
	(2,000 from Henninger, 650 from E. Beaver; 250 from Humphrey)	
Mid Oct – Late Oct	400 sheep (rams) moved from Humphrey to HDQ	
	3300 sheep at HDQ	
Late-Oct - Early Nov	1870 Sheep are maintained at the Mud Lake feedlot facility under agreement from DOE (this is when the ewes are mated)	
	1230 sheep graze at HDQ	
Early Nov – Mid Nov	3330 sheep at Mud Lake	
Early Nov - Mid Nov	2100 sheep are moved from Mud Lake to Snakey and Kelly allotments. 1200 sheep, (including Rams and ewe lambs) are retained at Mud Lake[e]	No
Early November - Mid-Jan (based on allotment dates and or weather conditions)	2100 Sheep graze on Snakey and Kelly FS allotments	No
	1100 sheep to Snakey allotment[b] 1000 sheep to Kelly allotment [c]	
Late Nov - Early February (based on allotment dates and weather conditions)	2100 Sheep are moved from Snakey and Kelly allotments to Bernice to graze on BLM allotment [d]	No
Late Nov - Early Feb	2100 sheep graze on Bernice allotment	No
Late Jan – Early Feb	2100 sheep are moved to Mud Lake feedlot from Bernice allotment	No

a - Rams are not with ewes and lambs (used 2930 ewes and 400 rams, this number is not exact and varies from year to year)

b - Snakey has 1200 sheep permitted for the allotment, Nov 6 to Jan 2, dates move out of Snakey/Kelly is based on weather conditions, if there is early snow accumulation move out dates area earlier than permitted dates. Sheep would always be moved out of Snakey on or before January 12 and always moved out of Kelly on or before January 13. From Snakey and Kelly sheep re moved to BLM Bernice allotment.

c - Kelly has 1000 sheep permitted for the allotment, Nov 20 to Jan 3. From Kelly sheep are moved to BLM Bernice allotment.

d - Bernice has 1050 sheep permitted for the allotment, Nov 23 to Feb 1, and 1050 sheep permitted for the allotment, Dec 06 to Feb 5, - from Bernice sheep are moved back to Mud Lake, then Back to HDQ.

e – 400 Rams and 800 ewe lambs are retained at Mud Lake when 2100 sheep are moved in mid November to graze at FS and BLM allotments

East Summer Range (Toms Creek)

Same effects as alternative 2.

West Summer Range (Odell/Big Mountain)

Forage utilization on West Summer Range would increase from 5.1 percent in alternative 1 to 7.2 percent in alternative 4. With increased forage use, stocking and utilization would still remain light. No grazing on East Summer would result in grazing West Summer (Odell/Big Mountain) each year. With rest rotation on some grazing units, good range conditions with a static or slight upward trend would continue. Small (less than 50 acres) areas of heavy use on sheep driveways, watering sites, bedding areas and herder camps would receive higher use. These high use areas would still be a very small percent of the total grazing area.

Table 27 displays alternative 4 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Alternative 4 - Summary Range Direct/Indirect Effects

Ending grazing and associated activities on the East Summer Range would have some favorable effects on range conditions discussed under alternative 1. However, with no grazing on East Summer Range, the Sheep Station would not have the range conditions necessary to continue its current and ongoing research mission.

Alternative 5 (No Grazing – Snakey, Kelly, Bernice Allotments)

Direct and Indirect Effects

Alternative 5 was developed in response to the public suggestion that grazing be eliminated to protect big horn sheep populations. AUMs used and 2,332 sheep retained for research are based on a 30 percent reduction from alternative 1 sheep inventory. Under alternative 5, USDA Forest Service East Beaver and DOI-BLM Bernice allotments would not be grazed. The remaining sheep would be maintained at the Mud Lake Feedlot where harvested feeds would be fed daily to meet nutrient needs of the sheep. A small number of sheep would be grazed on the DOE allotment surrounding Mud Lake Feedlot. Under alternative 5 sheep inventory reduction was necessary to remain within available funds for purchasing harvested feeds and maintaining a feedlot facility.

Table 28 displays alternative 5 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Table 29 displays available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days grazed by property.

Table 28. Alternative 5 general sheep grazing schedule

Dates [a]	Activity (Grazing dates are approximate depending on range readiness)	ARS Properties
Early January - Late April	2330 sheep are maintained at the DOE Mud Lake feedlot and in the feedlot facilities at Sheep Station headquarters (this is where the lambs are born during this period of the year) [b]	Yes / No
Late April - Late May	2330 Sheep are moved to turned out onto Sheep Station headquarters pastures in Idaho	Yes
Early June - Late June	460 sheep moved to Humphrey (rams and some ewes) [c]	Yes
	1870 sheep continue grazing at HDQ	
Late June - Early July	460 sheep graze at Humphrey	Yes
	1400 sheep trialed from HDQ to Henninger	
	470 ewes trucked from HDQ to East Beaver FS allotment	
Early July – Mid July	460 sheep at Humphrey	Yes
	1400 sheep (average number) sheep moved to W Summer Range and/or East Summer Range 2 out of 3 years)	Yes
	470 sheep continue at East Beaver allotment	no
Early August	1400 sheep trailed to ranch from East or West Summer Range	Yes
Mid August	630 sheep trucked to HDQ from East Beaver and Humphrey	Yes
	1400 sheep continue to graze at Henninger	Yes
Late Aug – Mid Oct	2030 sheep moved to and graze at HDQ	Yes
	280 sheep remain at Humphrey	Yes
Mid Oct – Late Oct	1310 sheep moved from HDQ to Mud Lake feedlots	No
	880 sheep continue grazing at HDQ	Yes
	140 rams remain at Humphrey	Yes
Early Nov – Late Dec	2330 sheep at Mud Lake feedlots	No

a Grazing dates are approximate depending on range readiness.
b A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).
c- Rams are not with ewes and lambs (2140 ewes and about 190 rams), this number is not exact and varies from year to year)

Forage use would be well within accepted standards to maintain healthy range conditions.

Headquarters, Humphrey and Henninger Ranches, East Summer and West Summer Ranges

Same effects as alternative 1.

Alternative 5 - Summary Range Direct/Indirect Effects

With no grazing on Snakey, Kelly and Bernice allotments under alternative 5, the Sheep Station would not have the range conditions necessary to continue its current and ongoing research mission.

Table 29. Alternative 5 - Projected annual AUM utilization on each property with approximate use dates

Properties	AUM available	AUM Utilized	Utilization, %	Approximate grazing dates	Approximate Grazing Days
Agricultural Research Service	48,667	1,967	4.0		
Headquarters	28,353	1,119	3.9	April 23 – June 25; September 1 – November 1	147
Humphrey	4,476	422	9.4	June 1 – October 20	142
Henninger	1,914	318	16.6	June 25 – July 9; August 31 – September 15	31
East Summer (Toms Cr.)	4,043	108	2.7	July 23 – August 31	60
West Summer (Odell Cr./Big Mt.)	9,881	350	3.5	July 9 – August 31	54
Under MOU (DOE, USDA-FS, DOI-BLM)	26,087	365	1.4		
Mud Lake	560	166	29.6	April 1 – June 15	76
Snakey-Kelly	1,756	0	-	NA	N/A
East Beaver	17,887	149	0.8	July 3 – September 1	61
Meyers Creek	3,076	50	1.6	July 5 – July 24	19
Bernice	2,808	0	-	NA	N/A

Range Cumulative Effects

The spatial boundary for range cumulative effects for this analysis includes ARS properties (Headquarters, Humphrey, Henninger, East and West Summer Ranges) and allotments under MOUs with the USDA Forest Service, BLM and DOE (Snakey- Kelly, East Beaver, Meyers, Bernice, Mud Lake Feedlot). Use of these lands is part of the overall grazing strategy for the Sheep Station.

The cumulative effects temporal scale includes effects of grazing activities prior to ARS owning some of the properties. The 28,000 acre Dubois Sheep Station (Headquarters property) was established in 1915. There are no records of on-site activities before the time ARS acquired Headquarters property. Grazing effects studies began in the 1920s, crested wheatgrass planting and forage production tests began in the 1940s. Grazing exclosures were established in the 1940s, 1950s (Bork 1997), 1960s and 1970s (Klements 1997) to assess grazing effects on plant composition and rangeland health. NRCS conducted range surveys on the Headquarters property to evaluate ecological status or range condition of the plant communities in 1989 and 1994. Site conditions on each vegetation type were sampled (162 study plots/sites), and on-site collected data was evaluated for sheep grazing effects. Results of these past and ongoing studies and the 2009 field survey data were analyzed to determine past present and foreseeable future effects for this NEPA project.

The East and West Summer Range grazing areas were withdrawn from the public domain in 1915, 1916, 1919, and 1922 and added to the ARS Dubois Sheep Station properties to provide the natural resource base for sheep and grazing research. Records indicate exclosures were constructed in 1960s on vegetative types where range conditions studies were done in the 1950s.

In 1991 a team of SCS range conservationists conducted a field inventory on the Summer Range property to evaluate ecological status of the plant communities. The primary purpose of this field inventory was to

determine ecological conditions and to provide a basis for predicting the extent and direction of change that can result in the plant community from specific vegetation treatments or management actions.

In 1994, 25 perennial tall forb community sites on the Summer Range were sampled, including three with grazing exclosures. These vegetation types were also surveyed in 1959, 1978, 1979 and 1994. In 2008, Klement and Moffet tested the hypotheses that site conditions such as biomass, taxonomic composition and richness, cover, bare ground and gopher mounding were constant among years and among levels of grazing on the grazed and ungrazed areas surveyed in 1959, 1978, and 1994. Results indicated sheep grazing on the Summer Range had no effect on subalpine tall forb vegetation communities. Between 1964 and 1994 grazing had been light with less than 11 percent of available forage used. Analysis results indicated no difference or shift between perennial tall forb to grass for either plant community either inside or outside exclosures (Klement and Moffet 2008). Summer range surveys done in 2009 to determine range health (condition) and trend had similar findings (Grooms 2009).

Humphrey and Henninger Ranches were purchased in 1940 and 1942, and added to the Sheep Station's Dubois operations. Prior to the purchase from private holdings, Humphrey and Henninger Ranches were mainly used for farming: livestock production, with some crop land and, hay, production. Before transfer to ARS, ecological site descriptions indicate Henninger was grazed at heavier rates, closer to available AUMs.

Historic information, current range studies and future surveys would continue to evaluate range health and provide information for future management actions.

Within the cumulative effects area, none of the individual ARS properties are adjacent to another. Sheep are trucked or trailed between properties and allotments. Therefore, effects on plant communities for each property are not interdependent. An increase or decrease in forage use and effects on range conditions on one property or allotment would not affect range condition on any other property. Humphrey Ranch east boundary is adjacent to part of East Beaver allotment and the north end of Meyers Creek allotment is adjacent to East Summer Range.

Cumulative effects from continued grazing and related activities including past, present, and foreseeable future grazing and related actions on ARS properties would not adversely affect the range resource.

Alternative 1 – Proposed Action

Mud Lake Feedlot

The Mud Lake allotment is primarily used as a feedlot operation. Harvested feeds provide the daily nutrient needs of sheep located there. A small number of sheep are grazed on the DOE allotment surrounding the feedlot with 560 useable AUMs. Stocking is light and utilization is also light at 160 AUMs used. The use period (April 1-June 1) on the feedlot allotment provides ample opportunity for regrowth during the area's prime growing season (June – August). No change is expected from continued current management.

Snakey, Kelly and Bernice Allotments

Currently these allotments are lightly stocked with resulting light utilization. The grazing period is during the non-growing season (November – February). Plants are annually rested from growing season use, which allows for recovery. Rotational grazing within these units assists in keeping utilization light. These allotments currently are the only grazing lands available for winter use. All other properties are unavailable to sheep due to snow cover and extreme winter conditions. Only Mud Lake feedlot using a daily feeding program could be used as an alternative to grazing these allotments.

Grazing during the non-growing season with light stocking and utilization helps maintain the range condition. Only small (less than 50 acres) areas (sheep trailing/watering/bedding) would continue to display sheep impacts. A satisfactory range vegetation condition of fair with upward or static trend would continue to be met. Existing infrastructure would be maintained. Snakey and Kelly are operated under an MOU with the Caribou-Targhee National Forest; grazing standards would continue. Bernice operates under a Bureau of Land Management MOU, Upper Snake Field Office, grazing standards (permitted AUMs used and grazing period) would continue to be met with no cumulative effects.

Meyers Creek Allotment

Currently this allotment is lightly stocked with an estimated 2.3 percent utilization. This is a transition unit between low- and high-elevation grazing areas. The grazing period is during two weeks in July. This allotment provides flexibility to move sheep from Henninger ranch earlier and allows East Summer range vegetation to achieve range readiness. The flexibility provided by Meyers Creek allotment provides for light stocking, low utilization and good range conditions on Henninger Ranch and East Summer range. Deferred use allows for recovery and regrowth after grazing. Meyers Creek allotment is rested, no grazing, when East Summer range is rested (1 in 3 years).

Short duration grazing with light stocking and utilization would maintain range condition. Only small (less than 50 acres) areas (sheep trailing/watering/bedding) would continue to display grazing use impacts. A satisfactory range vegetation condition of fair with upward or static would continue. Meyers Creek operates under an MOU with the Caribou-Targhee National Forest; grazing standards would continue to be met, with no cumulative effects.

East Beaver Allotment

Currently this allotment is lightly stocked with an estimated 1.2 percent utilization, rotational grazing provides rest for plant regrowth. Only small (less than 50 acres) areas (sheep watering/bedding) would display sheep impacts. Satisfactory range vegetation condition of fair with upward or static trend would continue. East Beaver operates under an MOU with the Caribou-Targhee National Forest; grazing standards would continue to be met, with no cumulative effects.

Alternative 1 – Summary Cumulative Effects

Table 30. Alternative 1 – percent of forage used, grazing period and grazing days by allotment

Allotment [a]	Available Forage AUMs[g]	AUMs Used	Percent of Available Forage Used	Inclusive Grazing Period	Approximate Grazing days Available
Mud Lake [e]	560	160	28.6	April 1 – June 1	62
Snakey-Kelly [b, c]	1756	421	24.0	Nov 1 – Dec 15	45
East Beaver	17887	213	1.2	July 3 – Sept 1	61
Meyers Creek	3076	71	2.3	July 5 – July 25	20
Bernice [d, f]	2808	650	23.2	Dec 15 – Feb 5	53

a - Grazing units within allotments are rest rotation grazed.
b - Snakey has 1200 sheep permitted for the allotment, Nov 6 to Jan 2, date move out of Snakey/Kelly is based on weather conditions, early snow accumulation would require move out dates earlier than permitted dates. Sheep would always be moved out of Snakey on or before January 12 and always moved out of Kelly on or before January 13.
c - Kelly has 1000 sheep permitted for the allotment, Nov 20 to Jan 3.
d - Bernice has 1050 sheep permitted for the allotment, Nov 23 to Feb 1, and 1050 sheep permitted for the allotment, Dec 06 to Feb 5,
e – 400 Rams and 700 ewe lambs are retained at Mud Lake when 2230 sheep are moved in mid November to graze at FS and BLM allotments
f- Grazing dates at Bernice depends on snow conditions, early snow requires moving earlier than February 5 with less days grazed.
g - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheep3 are equivalent to one (1) AUM.

There would be no cumulative effects from continued grazing and related activities including past, present, and foreseeable future grazing and related actions would not adversely affect the range resource.

Table 30 displays available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days available for grazing for each allotment.

Alternative 1 would continue to provide range conditions necessary for the Sheep Station to continue its mission of current and ongoing research.

Alternative 2 (No grazing ARS U.S. Sheep Experiment Station Properties and Bureau of Land Management/ Forest Service Allotments)

Mud Lake Feedlot

Grazing 158 AUMs during the growing season (April thru September) on the DOE allotment surrounding Mud Lake Feedlot could affect range condition. Fair range vegetation condition and upward or static trend may not be met. Continued growing season use of 28.2 percent of available AUMs with light stocking on Mud Lake property could reduce more palatable plants, affect species diversity and create conditions more favorable for noxious weeds.

Snakey, Kelly, and Bernice Allotments

Ending grazing would have little effect on this range. Currently these allotments are grazed only during the non-growing season. If sheep grazing on this land were terminated, slightly more forage could be available for wildlife. Additional plant canopy cover and litter would be available for soil protection.

The residual effects from past disturbances would recover at natural rates. This would include those areas of heavy use under alternative 1. Range vegetation condition of fair with upward or static trend would be met.

Meyers Creek Allotment

No grazing would have little effect on this range. Currently this allotment is very lightly stocked with an estimated 2.3 percent of available AUM used during two weeks in July. Meyers Creek allotment is a transition unit between low- and high-elevation grazing areas. Flexibility to graze Meyers Creek allotment reduces utilization on Henninger and East Summer Range, and provides favorable range condition effects. Meyers Creek allotment is not grazed when East Summer is rested (1 in 3 years) under alternative 1. With the current light use there would be very little difference in effects under alternative 2.

The residual effects from past disturbances would recover at natural rates. This would include any areas of heavy use under alternative 1. Range vegetation condition of fair with upward or static trend would be met. Noxious weeds could increase on this allotment without current control efforts implemented by the Sheep Station.

East Beaver Allotment

Ending sheep grazing would have little effect on this range. Currently, under alternative 1, East Beaver allotment is lightly stocked with an estimated 1.2 percent utilization. No sheep grazing would result in slightly more forage available for other uses, more canopy cover and additional litter left on site for soil protection or other benefits. Current sheep grazing under alternative 1with low forage use (1.2 percent) has very little effect on vegetation conditions.

The residual effects from past disturbances would recover at natural rates. This would include any areas of heavy use. Range vegetation condition of fair with upward or static trend would be met.

East Beaver allotment was originally planned as a common use allotment, for cattle and sheep grazing, to provide some forb use so that cattle grazing would not result in a shift from grass dominated to forb dominated. With no sheep grazing under alternative 2, cattle grazing, which is the bulk of the utilization for this allotment, would continue and may cause forbs to increase.

Alternative 2 – Summary Cumulative Effects

All properties except Mud Lake would be eliminated from grazing. Season long grazing at Mud Lake could cause an increase in less desirable plant species and more favorable conditions for noxious weeds.

Table 31 displays available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days available for grazing by allotment.

Table 31. Alternative 2 – percent of forage used, grazing period and grazing days by allotment

Allotment	Available Forage AUMs	AUMs Used	Percent of Available Forage Used	Inclusive Grazing Period	Approximate Grazing days Available
Mud Lake	560	158	NA	April 1 – Sept 20	173
Snakey-Kelly	1756	0	NA	NA	NA
East Beaver	17887	0	NA	NA	NA
Meyers Creek	3076	0	NA	NA	NA
Bernice	2808	0	NA	NA	NA

Ending grazing on ARS properties as well as Bureau of Land Management and Forest Service allotments would not provide the range conditions necessary for the Sheep Station to continue its current and ongoing research mission.

Alternative 3 (No grazing ARS U.S. Sheep Experiment Station Humphrey Ranch, East and West Summer Ranges)

East Beaver and Meyers Creek Allotments

Same effects as alternative 2.

Mud Lake/Snakey Kelly/Bernice

Same effects as alternative 1.

Alternative 3 – Summary of Cumulative Effects

Losing East Beaver and Meyers Creek allotments for sheep grazing would eliminate the Sheep Station's operations grazing/flexibility.

There would be no cumulative effects from continued grazing and related activities including past, present and foreseeable future grazing and related actions would not adversely affect the range resource.

Table 32 displays available forage in AUMs, AUMs used, percent of available forage used, available grazing period during the year, and approximate number of days available for grazing by allotment.

Table 32. Alternative 3 – percent of forage used, grazing period and grazing days by allotment

Allotment	Available Forage AUMs	AUMs Used	Percent of Available Forage Used	Inclusive Grazing Period	Approximate Grazing days Available
Mud Lake	560	158	28.2	April 1 – June 15	76
Snakey-Kelly	1756	337	19.2	Nov 8 – Dec 15	38
East Beaver	17887	0	NA	NA	NA
Meyers Creek	3076	0	NA	NA	NA
Bernice	2808	520	18.5	Dec 15 – Feb 5	53

No grazing and associated activities on Humphrey Ranch, East and West Summer Ranges and East Beaver and Meyers Creek allotments would provide some benefits to plant cover, mainly at the small areas affected by trailing, bedding, driveways, and watering site. However, no grazing on Humphrey Ranch and the East and West Summer Ranges and East Beaver and Meyers Creek allotments would result in range conditions that would not allow the Sheep Station to continue its current and ongoing research mission.

Alternative 4 (No Grazing East Summer Range, Meyers Creek Allotment)

Mud Lake Feedlot, Snakey, Kelly, Bernice, and East Beaver Allotments

Same effects as alternative 1.

Meyers Creek Allotment

No grazing on Meyers Creek allotment would eliminate transition grazing between low- and high-elevation grazing areas. Loss of Meyers Creek Allotment would affect operation flexibility and increase utilization on Henninger. All other affects are the same as alternative 2.

Alternative 4 – Summary of Cumulative Effects

There would be no adverse cumulative effects from continued grazing and related activities including past, present, and foreseeable future grazing and related actions on the current range resource.

Table 33 displays alternative 4 available forage in AUMs, AUMs used, percent of available forage used, grazing period used during the year, and number of days available for grazing by allotment.

Table 33. Alternative 4 – percent of forage used, grazing period and grazing days by allotment

Allotment	Available Forage AUMs	AUMs Used	Percent of Available Forage Used	Inclusive Grazing Period	Approximate Grazing days Available
Mud Lake	560	160	28.6	April 1 – June 1	62
Snakey-Kelly	1756	421	24.0	Nov 1 – Dec 15	45
East Beaver	17887	213	1.2	July 3 – Sept 1	61
Meyers Creek	3076	0	NA	NA	NA
Bernice	2808	650	23.2	Dec 15 – Feb 5	53

No grazing and associated activities on East Summer Ranges and Meyers Creek allotment would provide some benefits to plant cover, mainly at the small areas affected by trailing, bedding, driveways, and watering site. However, no grazing on East Summer Ranges and the Meyers Creek allotment for grazing

would result in range conditions that would not allow the Sheep Station to continue its current and ongoing research mission.

Alternative 5 (No Grazing – Snakey, Kelly, Bernice Allotments)

Meyers Creek, Snakey, and Kelly Allotments

Same effects as alternative 1

East Beaver and Bernice Allotments, Mud Lake Feedlot

Same effects as alternative 2

Alternative 5 – Summary of Cumulative Effects

There would be no cumulative effects from continued grazing and related activities including past, present, and foreseeable future grazing and related actions would not adversely affect the range resource.

Ending grazing and associated activities on Snakey-Kelly and Bernice allotments would provide some benefits to plant cover, mainly at the small areas affected by trailing, bedding, driveways, and watering site. However, no grazing on the Snakey-Kelly and Bernice allotments would result in range conditions that would not allow the Sheep Station to continue its current and ongoing research mission.

Range Effects Summary

Table 34 displays available AUMs for each property and allotment and percent used under each alternative.

Alternative 1 would continue to provide range conditions necessary for the Sheep Station to continue its mission of current and ongoing research. While not grazing on various ARS properties and USDA Forest Service and Bureau of Land Management allotments would change some range conditions, not grazing those various parcels in alternatives 2 through 5 would result in range conditions that would not allow the Sheep Station to continue its current and ongoing research mission.

Table 34. Available AUMs and percent AUMs used by alternative for each property

Property	AUMs Available	Percent of Available AUMs Used				
		Alt1	Alt2	Alt3	Alt4	Alt5
All ARS properties	**48,667**	**6.8**	**-**	**5.9**	**7**	**4**
Headquarters	28,353	5.6	-	9.1	5.6	3.9
Humphrey	4,476	13.5	-	-	13.5	9.4
Henninger	1,914	23.8	-	15.5	24.6	16.6
Summer East (Toms Cr.)	4,043	3.8	-	-	-	2.7
Summer West (Odell Cr./Big Mt.)	9,881	5.1	-	-	7.2	3.5
All Allotments under MOUs (DOE, USDA-FS, DOI-BLM)	**26,087**	**5.8**	**0.6**	**3.9**	**5.5**	**1.4**
Mud Lake	560	28.6	28.2	28.2	28.6	29.6
Snakey-Kelly	1,756	24	-	19.2	24	-
East Beaver	17,887	1.2	-	-	1.2	0.8
Meyers Creek	3,076	2.3	-	-	-	1.6
Bernice	2,808	23.2	-	18.5	23.2	-

Irretrievable or Irreversible Commitment of Resources

There would be no irretrievable or irreversible commitment of rangeland resources from effects of continued sheep grazing and associated actions under any alternatives.

Federally Threatened, Endangered, and Proposed Species

Canada Lynx (*Lynx canadensis*)

Disturbances to Canada lynx are unlikely in alternative 1 (the proposed action) as well as alternatives 4 and 5, based on low potential for year-round occupancy by lynx, lack of control measures directed at felines, and the presence of full time sheep herders and guard dogs that limit depredation. However, the potential exists for lynx to move through the area foraging and in search of larger expanses of high quality habitat. In such cases, disturbances would be limited to an occasional lynx temporarily avoiding the immediate area coincident with a band of domestic sheep, guard dogs, and herd dogs. Where suitable foraging and denning habitat is present in sufficient quantities, Canada lynx would temporarily adjust their location to avoid encounters, but continue to forage in nearby forested stands. Alternatives 1, 4, and 5 are not likely to adversely affect Canada lynx.

Alternatives 2 and 3 would have no effect on Canada lynx, since grazing and associated activities would not occur in the Centennial Range, suitable habitat for potential denning. The small potential for lynx to encounter herders or guard dogs would not occur, and there would be no competition for browse between domestic livestock and snowshoe hare.

Canada Lynx Affected Environment

A comprehensive review of Canada lynx life history can be found in Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000). A condensed version of life history from the Lynx Recovery Outline (USDI Fish and Wildlife Service 2005a) is summarized below.

Lynx are highly adapted for hunting snowshoe hare, the primary prey, in the snows of the boreal forest. Lynx in the contiguous United States are at the southern margins of a widely-distributed range across Canada and Alaska. The center of the North American range is in north-central Canada. Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Lynx survivorship, productivity, and population dynamics are closely related to snowshoe hare density in all parts of its range. Both timber harvesting and natural disturbance processes, including fire, insect infestations, catastrophic wind events, and disease outbreaks, can provide foraging habitat for lynx when resulting understory stem densities and structure provide the forage and cover needs of snowshoe hare. These characteristics include a dense, multi-layered understory that maximizes cover and browse at both ground level and at varying snow depths throughout the winter. Despite the variety of habitats and settings, good snowshoe hare habitat has a common denominator - dense, horizontal vegetative cover 1-3 meters (3-10 feet) above the ground or snow level. In northern Canada, lynx populations fluctuate in response to the cycling of snowshoe hare. Although snowshoe hare populations in the southern portion of the range in the contiguous United States may fluctuate, they do not show strong, regular population cycles as in the north. The southernmost extent of the boreal forest that supports lynx occurs in the contiguous United States in the Northeast, western Great Lakes, northern and southern Rockies, and northern Cascades. Here the boreal forest transitions into other vegetation communities and becomes more patchily distributed. As a result, the southern boreal forests generally support lower snowshoe hare densities, hare populations do not appear to be as highly cyclic as snowshoe hares further north, and lynx densities are lower compared to the northern boreal forest.

Canada lynx is a federally-listed threatened species and historically resided within the Centennial Mountain Range portions of the Sheep Station, which includes the West Summer Range (Odell Creek and Big Mountain) and the East Summer Range (Toms Creek). These areas are outside of, but adjacent to Lynx Analysis Units established on the Targhee National Forest in 2005. There is no Canada lynx critical habitat in the project vicinity. The Idaho statewide wildlife observation database indicates that historically, a number of Canada lynx have been observed in the Centennial Mountain Range. The TEAMS wildlife biologist has discussed occurrences of Canada lynx with US Fish and Wildlife Service in Chubbuck, ID (Arena 2008, 2009), Idaho Department of Fish and Game Biologists (Schmidt 2008, personal communications), and USDA Forest Service Biologists on the Caribou-Targhee National Forest (Aber, Keetch, Orme 2008, personal communications). Biologists with these agencies indicated that Canada lynx are unlikely to be currently residing year-round in the Centennial Range based on:

- A limited number of occurrences, 1874-1998
- Negative findings during hair snare surveys in 1999 - 2001, and
- Limited observations from winter track surveys conducted from 1996 - 2004.

A summary of lynx habitat and observation data compiled for the Caribou-Targhee National Forest (adjacent to ARS properties) is presented in a Forest report prepared by Orme (2005). In a biological assessment (Aber 2007) completed for sheep grazing on the USDA Forest Service Meyers Creek Allotment, which is adjacent to Toms Creek on ARS properties, the biologist determined that grazing activities would have "No Effect" on Canada lynx and are consistent with the Lynx Conservation Assessment and Strategy. According to maps prepared for the Lynx Conservation Agreement between the USDA Forest Service and the US Fish and Wildlife Service (USDA Forest Service 2006), areas in the Centennial Range are Secondary Habitat, which the Lynx Recovery Outline defines as "those with historical records of lynx presence with no record of reproduction; or areas with historical records and no recent surveys to document the presence of lynx and/or reproduction." A majority of habitat on ARS properties is unsuitable for lynx, because it is in lower elevation shrublands (Headquarters, Henninger Ranch). Higher elevation properties (West Summer Range, East Summer Range, and Humphrey Ranch) are potential lynx habitat but are of lower quality, because the properties do not contain large, connected expanses of boreal forest. ARS properties are outside of established Lynx Analysis Units.

Based on a review of the above information, there is potential for an occasional lynx to use the area traveling through high-elevation ARS properties in the Centennial Mountain Range, while temporarily foraging or moving between larger expanses of quality habitat in northwest Wyoming and Central Idaho. However, the area is unlikely to be currently occupied by a resident lynx population considering the lack recent observations in the Centennial Range and the status of adjacent habitat on USDA Forest Service lands as unoccupied according to the Lynx Conservation Agreement (USDA Forest Service 2006).

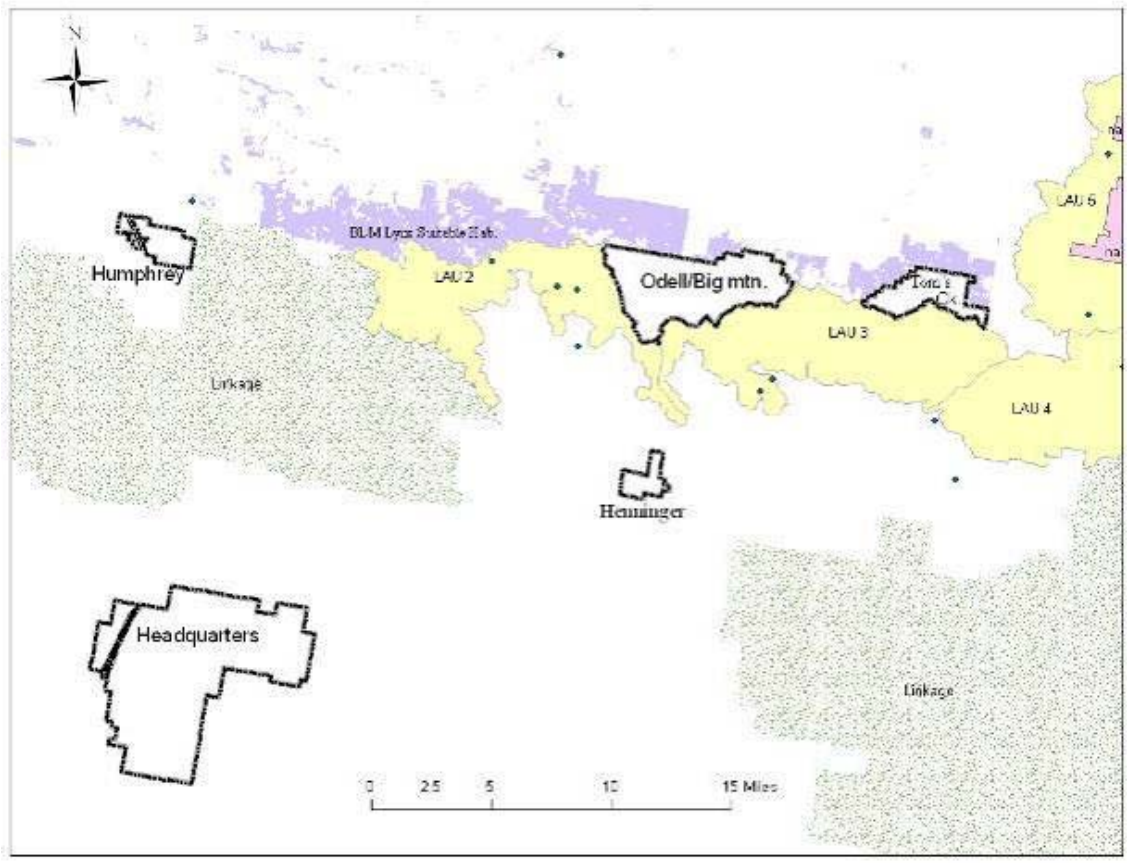

Figure 39. Sheep Station grazing lands adjacent to LAUs on the Caribou-Targhee NF, 2005

Canada Lynx Direct/Indirect Effects

Alternatives 1, 4, and 5 Direct and Indirect Effects Canada Lynx

- Alternative 1 represents current operations at the Sheep Station.
- Alternative 4 - No grazing would occur on the East Summer Range as well as Meyers Creek allotment.
- Alternative 5 - No grazing would occur on the Snakey/Kelly and Bernice Allotments.

The effects of these three alternatives are nearly the same since grazing operations take place in suitable lynx habitat in the Centennial Mountains which is thought to be unoccupied.

A review of the activities for each of these alternatives indicates that minimal, if any, effects would occur with regard to Canada lynx, both to individuals as well as to habitat. No effects would occur to designated critical habitat as none is present, and none is being proposed or considered in the area.

Most of the activities would have no effect on Canada lynx or their habitat. Those activities that occur in sagebrush shrublands at lower elevation are outside of lynx analysis units; and are in areas that do not have continuous forested cover, and do not provide adequate habitat features for denning or routine lynx

foraging activities. The activities that are outside of suitable habitat and thus would have no effect include:

- All livestock grazing and camp tending activities during winter months,
- Livestock trucking activities,
- Cattle and horse research grazing,
- Activities on the Mud Lake Feedlot facility,
- Prescribed fire, Integrated pest management,
- Temporary watering sites,
- Road maintenance,
- Water diversions, and
- Permanent fencing and its maintenance.

Within the Centennial Range, there are five permanent watering features. However, their presence and associated maintenance activities would not alter available lynx habitat, do not affect lynx prey, nor would they be expected to affect individual lynx.

Activities that could have minimal effects to Canada lynx occur during the summer grazing season and are within or adjacent to suitable habitat. These activities include sheep grazing and trailing and camp tending activities in the West Summer Range (Odell Creek and Big Mountain) and the East Summer Range (Toms Creek). Although Canada lynx have not been recently documented within the Centennial Mountains through hair snare surveys, suitable habitat is present in these high elevation forests. They support a low density population of snowshoe hare, lynx primary prey, as well as patches of large diameter downed wood suitable as denning habitat. The delineation of Lynx Analysis Units (2005) in habitat nearby on the Targhee National Forest indicates the presence of suitable habitat.

Though habitat may be suitable, expected effects from the above activities are minimal. Domestic sheep are only present in the East and West Summer Range area for a short duration during the summer, generally from start of July through the first week of September. This period is not critical to denning, and any Canada lynx that might be in the area could continue to forage across the landscape. Human disturbances may result in an occasional incident where lynx temporarily avoid the immediate area coincident with a band of domestic sheep, guard dogs, and herd dogs. Where there exists small patches of suitable foraging and denning habitat in sufficient quantities, Canada lynx would remain in the area, but temporarily adjust their travel and foraging locations to avoid direct encounters.

Another possible indirect effect to lynx is that associated with competition for browse between livestock and snowshoe hare (Ruediger et al. 2000). On-the-ground conditions quantified in the Range Report (2011) indicate that sheep grazing in the Centennial properties is of low intensity with a high amount of available forage. Light stocking and a rotation schedule that rests areas one year in three have allowed for highly productive range conditions with a stable or upward trend. Appropriate diversity of forbs, shrubs, and grasses is present, and in 2009, forb production was double or triple that expected. Utilization was light. Visual comparison of plants inside exclosures that have not been grazed in over 30 years to those outside the enclosures showed no difference in vegetative composition. Forested understory that provides winter cover and browse for snowshoe hares is present, and remains unaltered by the sheep grazing

activities except where down logs are occasionally bucked into pieces to allow sheep passage along established trails. Near pristine on-the-ground conditions in the Summer Range are a result of many previous years in which the proposed activities have been occurring, and indicate that long-term habitat changes that might be of concern (described in the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) would not occur from the proposed activities.

No effect to Canada lynx from predator control activities is expected. Sheep herders are trained annually on predator control procedures. In order to protect the sheep herd and for the herder's safety, they are outfitted with rifles and all ammunition is inventoried. Fired ammunition is accounted for through an explanation to their supervisor. Herders are instructed how to address problems with wolves (*Canis lupus*), coyotes (*Canis latrans*), mountain lions (*Felis concolor*), and black bears (*Ursus Americanus*). Instructions are issued in semi-annual trainings that herders should not fire weapons at bobcat or lynx since they are difficult to identify, and the Canada lynx is a federally protected species. Ruediger et al. (2000) describes the risk of lynx mortality from predator control activities targeted for other carnivores as low because trapping efforts are reduced from historical levels, trapping efforts target individual offending animals, and trapping usually occurs in lower elevations (outside of lynx habitats). An interview with Wildlife Services (Farr 2008, personal communication) who conducts control actions on ARS properties indicated that:

- They have not caught any lynx in leghold traps.
- The lower elevation ARS properties are not suitable lynx habitat.
- There have been no depredations by felines in the Summer Range properties, so trapping for felines has not been necessary.
- Mr. Farr is not aware of lynx being captured in the area related to fur trapping.
- Canada lynx are unlikely, or unexpected to occupy the area.
- When trapping, Wildlife Services uses lures specifically targeted for canines and thus, greatly reduces potential of inadvertently capturing felines such as Canada lynx.

In addition to the information above that indicates a minimal potential for negative effects, it should also be noted that there is a very low probability of Canada lynx occurrences on ARS properties as discussed previously.

Alternatives 2 and 3 Direct and Indirect Effects for Canada Lynx

- Alternative 2 - No grazing would occur.
- Alternative 3 - No grazing would occur on ARS properties in the Centennial Range.
- These alternatives have the same effects on Canada lynx because grazing is eliminated in/or near suitable habitat that could provide for a resident population of lynx.

Elimination of all grazing and associated activities (alternative 2), or all grazing activities in the Centennial Range (alternative 3) would eliminate the potential effects discussed in other alternatives. Human disturbances from Sheep Station activities would not occur which otherwise may result in uncommon occasions where lynx avoid the immediate area coincident with a band of domestic sheep, guard dogs, and herd dogs. Where there exists small patches of suitable foraging and denning habitat in sufficient quantities, Canada lynx would not have to temporarily adjust their travel and foraging locations

to avoid direct encounters. There would be no competition for browse between livestock and snowshoe hare.

Canada Lynx Cumulative Effects

The spatial boundary for the discussion of cumulative effects for Canada lynx is the Centennial Mountain Range, because this landscape incorporates multiple Lynx Analysis Units established by the USDA Forest Service (2005) in cooperation with the USDI Fish and Wildlife Service, and is large enough in size to support a resident population of several lynx. The temporal boundary is from present day through the next 10 years because projections beyond that timeframe are similar to that being described, but with reduced accuracy.

As stated in the affected environment section of the report, the official status of adjacent habitat on USDA Forest Service lands is unoccupied according to the Canada Lynx Conservation Agreement (USDA Forest Service 2006). There is potential for occasional lynx to use the Centennial Mountains while temporarily foraging or moving between larger expanses of quality habitat in northwest Wyoming and Central Idaho. The proposed project and alternatives do not reduce available habitat, would not add additional effects which would render potentially occupiable habitat as unsuitable, nor would it deter from the Centennial mountains ability to provide temporary Canada lynx travel and foraging between higher quality habitat in Yellowstone or Central Idaho. As such, the project and alternatives do not contribute to additional cumulative effects.

There are no interrelated actions associated with this project. Interdependent actions include livestock grazing permits issued in Targhee National Forest lands, as well as past and proposed timber sales there. Existing habitat on National Forest System lands is managed in compliance with the Lynx Conservation Assessment and Strategy, the Lynx Conservation Agreement, as well as Northern Rockies Lynx Management Direction (2007) and thus, would maintain conditions that provide for continued protection and recovery of Canada lynx. Considering that effects from the proposed project are negligible, and effects from past or planned projects provide for lynx conservation, then there are no additional cumulative effects to Canada lynx from the project proposal or its alternatives.

Preliminary Canada Lynx Biological Determination

This determination is preliminary. It will be finalized by the project wildlife biologist prior to implementation of the project decision. Discussions between the USDI Fish and Wildlife Service and the wildlife biologist have occurred on numerous occasions and will continue. Consultation would conclude after the biological assessment is finalized and signed, submitted to the USDI Fish and Wildlife Service for their consideration and (if/when) concurrence is provided.

The project biologist has determined that alternatives 1, 4, and 5 "USSES (Sheep Station) Grazing and Associated Activities - May affect, but are not likely to adversely affect Canada lynx." This determination is supported by rationale presented in the Biological Assessment and summarized below.

- Suitable lynx habitat is present, however that habitat has been identified as having a low potential for year-round occupancy, and recent observations of Canada lynx in the area are rare.
- Canada lynx have not been targeted for abatement on ARS properties, nor are there records of personal accounts indicating that abatement actions have been taken to control Canada lynx on ARS properties. No take would occur from predator control activities.

- Grazing practices and associated activities implemented by the Sheep Station do not affect denning habitat, do not remove cover important to lynx travel, and retain adequate cover and forage available to snowshoe hares, lynx primary prey. Activities are consistent with standards in the Lynx Conservation Assessment and Strategy.
- Cumulative effects of the project are negligible.
- Negative effects are unlikely. If they occur at all, they would be limited to small temporary changes in daily movements. In the Centennial Mountains, individual lynx moving through the area may make small temporary adjustments in habitat use/travel routes to avoiding conflicts with guard dogs and/or humans associated with grazing a band of sheep.

Grizzly Bear (*Ursus arctos horribilis*)

Grizzly Bear Affected Environment

On September 21st, 2009, grizzly bears in the Yellowstone distinct population segment returned to their previous status listed as a threatened species. The USDI Fish and Wildlife Service decision to remove the Yellowstone Distinct Population Segment of grizzly bear from the list of threatened species (USDI Fish and Wildlife Service 2007a) was vacated by order of the United States District Court (2009) in Missoula, Montana, based on two (of four) court findings:

> **The court found that the Conservation Strategy, Forest Plan Amendment, and State Plans are not adequate regulatory mechanisms because they are minimally enforceable, particularly outside of the primary conservation area, and rely on good faith and future promises of action. In addition, the final rule to delist didn't adequately analyze how various laws will protect the species.**
>
> **The court found that the USDI Fish and Wildlife Services did not articulate a good rationale regarding expected declines in whitebark pine and a lack of a threat grizzly bears.**

In contrast, the court found in favor of the plaintiffs (USDI Fish and Wildlife Service) regarding the other two points of the complaint.

> **The court found that the USDI Fish and Wildlife Service analysis adequately demonstrated that maintaining a population size of 500 animals is sufficient for genetic diversity. Similarly, that translocation from other populations is an adequate method to address genetic diversity shortfalls over the long term, and that there is not a short-term issue with genetics. The population does not need to be "self-sustaining" to be delisted.**
>
> **The court found that the USDI Fish and Wildlife Service analysis and the final rule to delist provided good rationale that the Distinct Population Segment /Primary Conservation Area (PCA) constitutes a significant portion of the Yellowstone grizzly bears' range. The USDI Fish and Wildlife Service did not need to identify migration corridors, because grizzlies, outside of the Distinct Population Segment boundary, are still protected under Endangered Species Act.**

The Yellowstone Distinct Population Segment of grizzly bear was de-listed in 2007 because of an increasing population in and around Yellowstone National Park in the bear's Primary Conservation Area, and because grizzly bears are expanding their range to inhabit suitable habitat throughout the boundaries

of the Distinct Population Segment (which includes ARS Sheep Station properties). Though the species has since been relisted, both of these factors are still applicable in evaluating the context of potential effects of the project. The US Fish and Wildlife Service Grizzly Bear Recovery website (http://www.fws.gov/mountain percent2Dprairie/species/mammals/grizzly/yellowstone.htm) summarizes information from the Final Rule to Delist (USDI Fish and Wildlife Service 2007) stating that,

> **The range of the Yellowstone grizzly bear population has increased dramatically as evidenced by the 48 percent increase in occupied habitat since the 1970s. Yellowstone grizzly bears continue to increase their range and distribution annually and grizzly bears in the Yellowstone area now occupy habitats they have been absent from for decades. Currently, roughly 84-90 percent of females with cubs occupy the primary conservation area and about 10 percent of females with cubs have expanded out beyond the primary conservation area within the distinct population segment boundaries. Grizzly bears now occupy 68 percent of suitable habitat within the distinct population segment boundaries and may soon occupy the remainder of the suitable habitat.**

ARS properties are within the Yellowstone Distinct Population Segment boundary for grizzly bear, but outside of the Primary Conservation Area. None of the ARS properties reside within the Primary Conservation Area. Suitable habitat for grizzly bear is managed differently within the Primary Conservation Area verses outside of it. As an example of this varying management strategy, The Forest Plan Amendment for the Grizzly Bear Habitat Conservation for the Greater Yellowstone Area National Forests (USDA Forest Service 2006) states succinctly,

> **Manage grizzly bear habitat outside the Primary Conservation Area in areas identified in state grizzly bear management plans as biologically suitable and socially acceptable for grizzly bear occupancy, accommodate grizzly bear populations to the extent that accommodation is compatible with the goals and objectives of other uses.**

The Sheep Station has an Interagency Agreement (USDA Forest Service 2007) with the Caribou-Targhee National Forest for grazing on the Meyers Creek allotment, which is inside the Primary Conservation Area. This grazing has been analyzed previously in a biological evaluation (Aber 2007) prepared by the Forest Service Wildlife Biologist which found that ,"Continuing grazing on the allotment may impact individual grizzly bears or their habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species." This finding was based on:

- The Sheep Station sheep grazing in the Meyers Creek allotment for decades with minimal conflicts,
- Standards and guidelines from the Grizzly Bear Forest Plan Amendment are being met, and
- "The permittees (Sheep Station) have had an excellent record of avoiding conflicts with bears for many years."

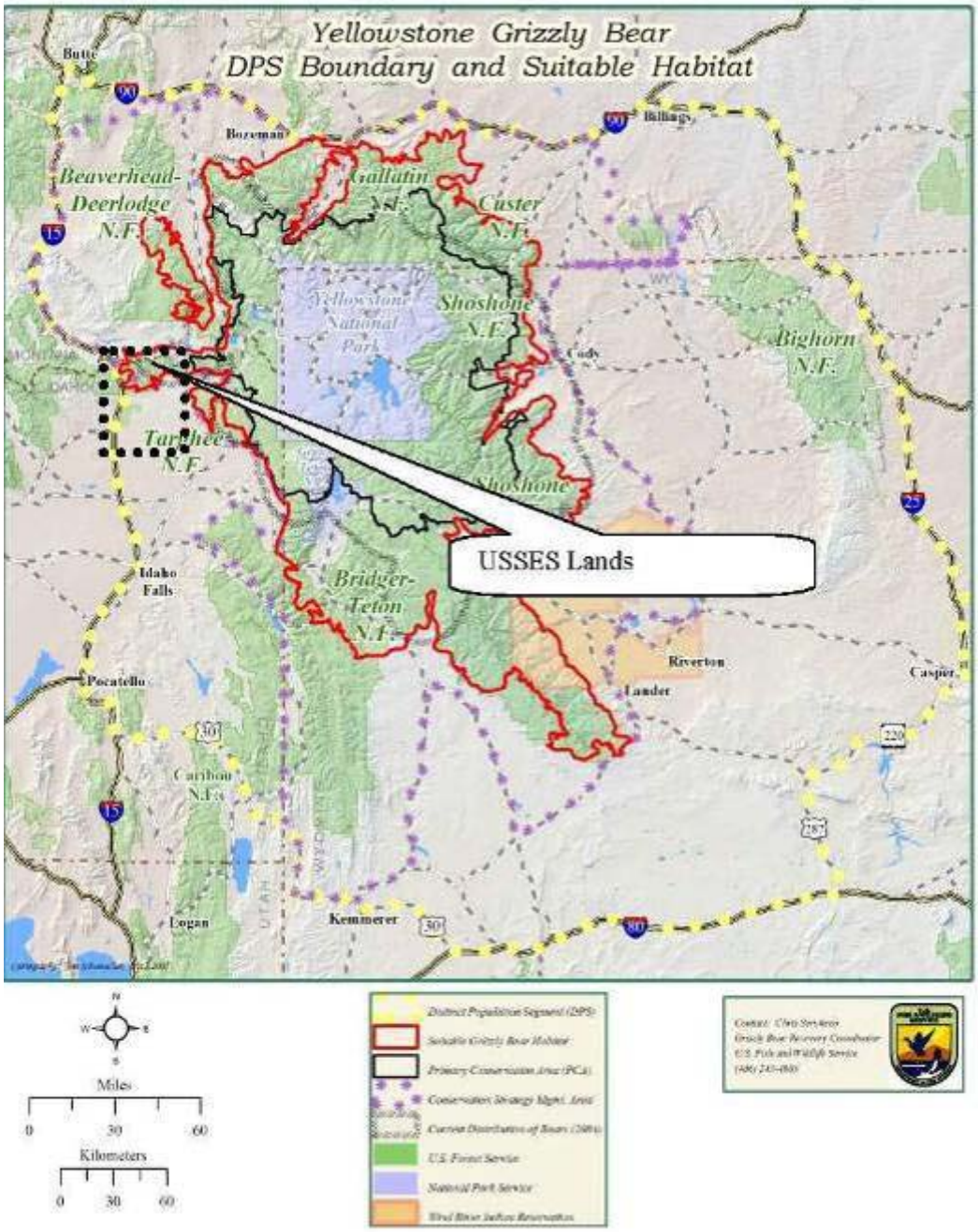

Figure 40. Vicinity map, Yellowstone grizzly distinct population segment

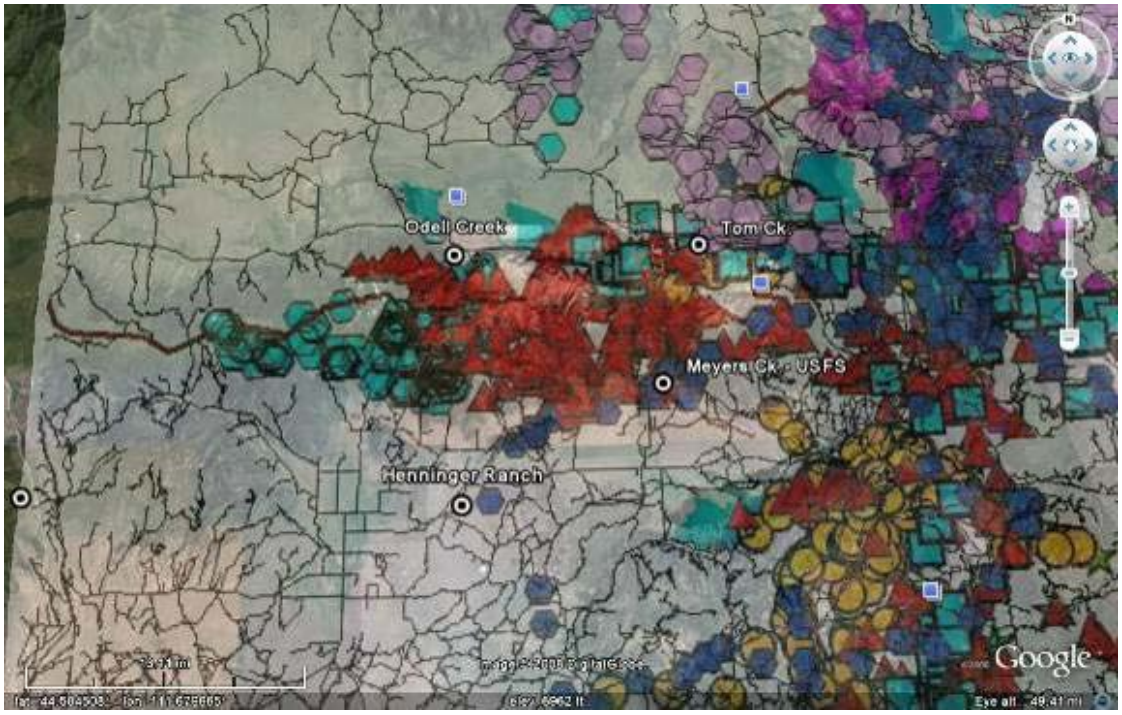

Figure 41. 2007 telemetry data showing grizzly bears observed near Montana portions of ARS properties

Based on 2007 radio-telemetry data of grizzly bear activity and habitat types on the ARS properties (seen in Figure 40 and Figure 41), the following can be inferred about grizzly bear habitat and occupancy on ARS properties.

- Two ARS parcels exist in Montana in high-elevation portions of the Centennial Range. These parcels contain suitable habitat that is occupied by grizzly bear. They include the East Summer Range (Toms Creek) and West Summer Range (Odell Creek and Big Mountain). All are outside of the grizzly bear Primary Conservation Area.

- The Henninger Ranch is a small ARS property in Idaho, at the base of the Centennial Range. Telemetry data indicates that, on occasion, grizzly bear have been in the vicinity of this parcel. However, the presence of county roads, open sagebrush habitat, and lack of white bark pine limit its value to grizzly bears. On rare occasion, this parcel could be temporarily occupied by a traveling grizzly bear.

- All other parcels of ARS properties are in Idaho and are unlikely to be occupied by grizzly bear. These parcels are dominated by sagebrush with frequent motorized activity on county roads. 2007 telemetry data indicated no grizzly bear observations on or adjacent to these properties. They include Humphrey Ranch and the Headquarters.

- The Sheep Station grazes sheep on additional federal agency lands. With the exception of the Meyers Creek Allotment on National Forest System land, these areas do not support grizzly bear activity, are dominated by sagebrush, and recent telemetry data showed no observations on or adjacent to these areas. They include the Snakey/Kelly allotment, East Beaver allotment (both National Forest System), Bernice allotment (Bureau of Land Management), and the Mud Lake Feedlot (Department of Energy).

A summary of key information from the Annual Report of the Interagency Grizzly Bear Study Team (Schwartz et al. 2009, 2010) includes the following information pertinent to the Sheep Station:

- There have been no grizzly bear conflicts on the Meyers Creek Sheep allotment of the Caribou-Targhee National Forest in the last five years. The Icehouse sheep allotment, which is adjacent to the Meyers Creek allotment, was permanently closed in 2008 as part of the effort to voluntarily close sheep allotments within the primary conservation area.

- Small reductions in grizzly bear secure habitat in the Centennial Bear Analysis Unit, which includes the ARS properties, are related to updated mapping efforts on the Caribou-Targhee National Forest, and no actual decrease in security occurred (2009 Grizzly Bear Habitat Monitoring Report, prepared by the Greater Yellowstone Area National Forests and National Parks, Yellowstone Grizzly Coordinating Committee Habitat Modeling Team, and included in annual report).

- The Grizzly Bear Habitat Conservation Guideline for Livestock Grazing states - Outside the Primary Conservation Area in areas identified in State (Idaho and Montana) Management plans as biologically suitable and socially acceptable for grizzly bear occupancy, livestock allotments or portions with recurring conflicts that cannot be resolved through modification of grazing practices may be retired as opportunities arise with willing permittees.

- There were 48 known and probable grizzly bear mortalities in 2008. Thirty-seven (37) of the 2008 mortalities were human caused (77percent). Of the 37 human caused mortalities, 20 were related to black bear and other hunting incidents, 10 were management removals, two were malicious killings, two were in defense of residences, two were related to handling of animals, and one was a road kill. None of these occurred on ARS property or in Meyers Creek.

- In 2009, there were 31 known and probable grizzly bear mortalities, 24 of which were human caused. Approximately 45 percent of the human caused mortality was hunting related (Schwartz 2010). None of these occurred on ARS property or in Meyers Creek.

- In summary, for 2009, grizzly bear monitoring results indicate a healthy grizzly bear population at or approaching recovery criteria. The monitoring results summarized in the 2009 Annual Report (Schwartz 2010) display the following key information:

    - Unduplicated females with cubs of year were modeled at 55, which meets the recovery criteria of 48;
    - The total population estimate in the Greater Yellowstone Ecosystem was estimated at 582 grizzly bears;
    - All 18 bear management units were occupied by females with young;
    - Natural and human caused mortality was with sustainable limits for independent males, independent females, and dependant young.

Effects to migration corridors and genetic diversity regarding the Yellowstone Distinct Population Segment of grizzly bears were brought up as a concern during public scoping. In order to review the pertinence of this concern to Sheep Station activities, summarized below is the current science regarding genetic diversity from the Final Rule to delist (USDI Fish and Wildlife Service 2007a). Key points include:

- Current levels of genetic diversity are consistent with known historic levels and do not threaten the long-term viability of the species.

- The Final Conservation Strategy (2007) includes the transplant of one to two effective migrants per generation if no movement or genetic exchange is documented by 2020.

- "the viability of the Yellowstone grizzly bear population is unlikely to be compromised by genetic factors in the near future…" and that "…one to two effective migrants per generation from the Northern Continental Divide Ecosystem (NCDE) to the Yellowstone ecosystem is an appropriate level of gene flow."

Indicators of fitness in the Yellowstone population demonstrate that the current levels of genetic heterozygosity[11] are adequate, as evidenced by measures such as litter size, little evidence of disease, high survivorship, an equal sex ratio, normal body size and physical characteristics, and an increasing population.

- Yellowstone grizzly bear populations are not as low as previously feared, and the need for novel genetic material is not urgent.

- In addition to monitoring for gene flow and movements, interagency efforts will continue toward completing the linkage zone task in the Recovery Plan (USDI Fish and Wildlife Service 1993, pp. 24-26) to provide and maintain movement opportunities for grizzly bears, and reestablish natural connectivity and gene flow between the Yellowstone grizzly bear Distinct Population Segment and other grizzly bear populations.

- Linkage work not directly associated with the Yellowstone grizzly population is being completed in the northern Rockies, to address ways to improve cooperation and affect management on public lands, private lands, and highways in linkage areas across the northern Rockies.

The recent court challenges to relist the grizzly bear included genetic diversity concerns, and their merit was reviewed by the court (U.S. District Court 2009). The court found that in the Final Rule to delist the grizzly bear, the USDI Fish and Wildlife Service provided adequate evidence to support that maintaining a population size of 500 animals is sufficient for genetic diversity, there is not a short-term issue with genetics, and that translocation from other populations is an adequate method to address genetic diversity shortfalls over the long term.

Summary of Grizzly Bear Mortality Factors

Evidence that conflicts occur between grizzly bears and domestic sheep grazing is well supported. Knight et al. (1983) conducted a study to evaluate grizzly bears that killed livestock by radio-collaring 37 grizzly bears and tracking their movements and associated livestock conflicts between 1975 and 1979. Knight found that 7 of the 37 collared bears killed domestic sheep when they came into contact with them. It should be noted that the study occurred when sheep grazing was more prevalent within occupied grizzly bear habitat, many of the bears that were radio collared were already problem bears, and some sheep herders/private livestock operations were likely averse to protecting the newly listed grizzly bear. In the report, Knight makes assumptions about poaching by herders that plays an important role in projecting excessive grizzly bear mortality. This assumption does not apply to sheep herders employed by the Sheep Station given their status working for the federal government.

In 2004, Gunther et al. prepared *Grizzly bear - human conflicts in the Greater Yellowstone ecosystem, 1992-2000*. This report presents several pieces of information quantifying the likelihood of grizzly bear mortality and effects to population. Although 44 percent of grizzly bear conflicts were attributed to

[11] Heterozygosity : having dissimilar pairs of genes for a hereditary characteristic, used as a correlation to estimate the level of inbreeding within a population.

livestock depredation, 71 percent of them were related to cattle incidents and a total of 2 grizzly bears were killed because of sheep related incidents over the 8 year study period. Grizzly bears were killed at a rate of one dead bear per 39 sheep incidents. When grizzly bears did depredate on sheep, they killed an average of 4.3 sheep per incident. The 2004 report acknowledges that permanent removal of chronic depredators has been the most effective method of alleviating livestock losses while having minimal impact on long term survival of the grizzly bear populations.

In 2009 the Interagency Grizzly Bear Study Team (IGBST) prepared the *Yellowstone Grizzly Bear Mortality and Conflict Reduction Report* (Interagency Grizzly Bear Study Team 2009). This report summarized the sources of grizzly bear mortality from 1997 through 2008. In addition, they reviewed the effectiveness of recommendations made in 2004, and made additional recommendations to reduce grizzly mortality into the future. Table 35 provides a summary of the total number of known and probable grizzly bear mortalities in the Yellowstone Ecosystem between 1997 and 2009. Data was taken from the 2008 *Yellowstone Mortality Report* (Interagency Grizzly Bear Study Team 2009) and the 2009 and 2010 *Known and Probable Grizzly Bear Mortalities in the Greater Yellowstone Area*, which is published on the Northern Rocky Mountain Science Center website (Interagency Grizzly Bear Study Team 2011). 293 grizzly bears were killed in 1997 through 2009. Various forms of confrontation with humans (but unrelated to hunting) resulted in nearly 31 percent of mortality. These confrontations included defense of life in "Front Country" settings, "Backcountry" settings, management removal in populated areas, management removal because of human injury, road kill, and accidental bear death during management captures. Encounters related to hunting contributed another 26 percent of the mortality which includes mistaken identification during black bear season and hunter defense of life during big game seasons. A substantial amount of mortality between 1997 and 2008, nearly 20 percent, remained "undetermined" indicating that a dead bear was found, but investigations were unable to determine a specific human or natural cause of death. There is no indication that these undetermined mortalities were related to sheep grazing. The smallest amount of known and probable mortality, just over 1 percent, can be attributed to the sheep grazing activities, including three management removals and one illegal kill over the 12 year period. None of these mortalities are associated with Sheep Station activities.

Table 35. Known and probable grizzly bear mortalities, 1997-2009

Category of Mortality	Mortality, Number of Bears	Percentage of Total Mortality
Confrontation	90	30.72
Hunting	76	25.94
Undetermined	58	19.80
Natural	24	8.19
Poaching	16	5.46
Cattle Protection	13	4.44
Research	6	2.05
Under Investigation	6	2.05
Sheep Protection	4	1.37
Grand Total	**293**	**100**

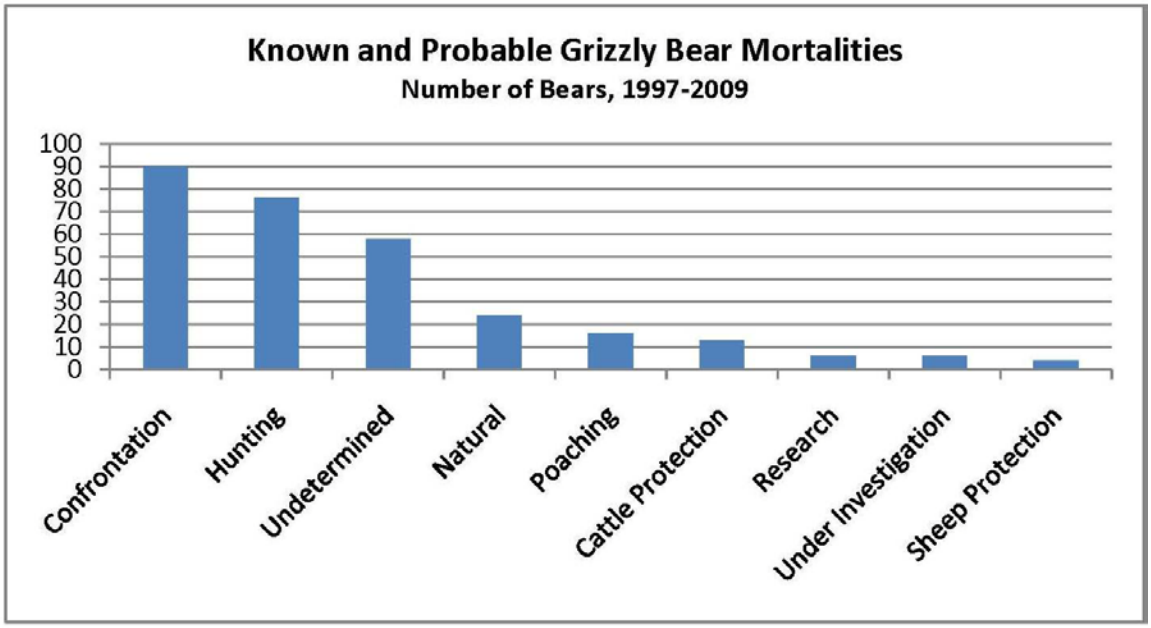

Figure 42. Number of known and probable grizzly bear mortalities, 1997-2009

In 2010 there were 50 known and probable grizzly bear mortalities in the Greater Yellowstone Ecosystem (Interagency Grizzly Bear Study Team 2011). Similar to previous years, mortality related to confrontations (36 percent) and hunting season conflicts (22 percent) made up a majority of the mortality. Although livestock conflicts resulted in 14 percent of the mortality, only one of those mortalities was identified in relation to domestic sheep, three were identified in relation to cattle, and three were identified as livestock which are presumed to be cattle and/or horse. Remaining causes of mortality included undetermined or under investigation (18 percent), natural causes (8 percent), and research (2 percent). None of these mortalities are associated with Sheep Station activities.

Activities to Reduce Grizzly Bear Conflicts

The Sheep Station implements a number of conservation measures to reduce the likelihood of potential conflicts with grizzly bear (as well as other predators) and domestic sheep or other livestock. These measures include:

1. Grizzly bear trapping, transportation, or lethal removal is outside the scope of this project and thus, if needed, would require the Sheep Station to re-initiate consultation or conduct an emergency consultation, in order to consider the probability of incidental take.
2. When creating research plans that include a sheep grazing component, consider the history of livestock-bear conflicts within ARS properties, pastures, and sub-drainages. Where a history of conflicts suggests the likelihood of habituation developing, the Sheep Station would modify the grazing schedule and/or sheep movements to avoid recurring conflicts.
3. Use good husbandry practices so that sheep are as healthy as possible, are suitable for research, and the number sick/stray animals is kept to a minimum. An institutional animal care and use committee evaluates research protocols and livestock management practices to ensure they are consistent with good animal husbandry, and comply with Federal laws that govern the use of agricultural animals in research. Protocols and practices that do not comply are not approved.

4. Sheep herders, working dogs, and guard dogs are kept with the sheep full-time when on rangelands to reduce the likelihood of encounters, and to assist in efficient and prompt movement of animals when necessary. In the summer range, sheep are accompanied by a minimum of two guard dogs, two herd dogs, and a full time sheep herder. Very few stray animals occur over the course of the season because of the close contact the sheep herders have with sheep. In the evenings, sheep are bedded on an approximate one-acre area. On moonlit nights when sheep have the tendency to get up and graze, extra vigilance is necessary to watch over sheep. Lame animals that may occur on occasion are watched closely because of the impact they have on moving the herd, and because animals need to be accounted for to maintain research objectives. Therefore, when lame animals do not recover, they are subsequently removed from the herd within a short period of time, (approximately every 3 days when the camp tender brings supplies) and transported back to the headquarters property.
5. All unnatural attractants to bears are minimized. This includes treatment or removal of livestock carcasses, and proper storage of human foods, garbage, and dog food. Approved "bear-proof" containers are used, and damaged containers are repaired or replaced so that they work as designed. Camp tenders and managers make periodic visits (approximately every three days) to remove trash and/or dead animal carcasses in order to eliminate potential bear attractants. In some locations it is not feasible to remove carcass (due to degree of decomposition and/or access to get them out). In such cases, the carcass is left in place and decomposition expedited with the addition of lime.
6. At least two formal training-orientation meetings are conducted annually with Sheep Station employees and herders to review identification of grizzly bear, black bear, bighorn sheep, Canada lynx, mountain lions, etc. In addition, they discuss Sheep Station sanitation and garbage removal practices, nonlethal procedures to address livestock-wildlife encounters, and who to contact should encounters occur. Training and education are ongoing and not limited to formal meetings.
7. Regarding grizzly bears, herders are instructed to avoid an encounter. Moving the sheep to other areas of the pasture may occur to avoid an immediate threat, and moving sheep to other pastures/locations would occur if encounters persist.
8. Sheepherders carry guns and bear spray for safety and to scare off inquisitive animals. If a grizzly bear is threatening sheep, herders may discharge their rifle into the air if they think it would help frighten the bear (hazing). A herder may shoot directly at a grizzly bear only if his personal safety is threatened, however this situation has not occurred with Sheep Station grazing, and is not expected to occur.
9. Herders are to report all bear sightings to their supervisor. When on Agricultural Research Service property, all existing and suspected bear activity and (or) conflicts are reported directly to APHIS Wildlife Services. APHIS Wildlife Services then contacts state and federal agencies as necessary to conduct damage investigations.
10. All sightings that are confirmed grizzly bears, or show positive evidence of grizzly bear in the vicinity of livestock would be reported by the Sheep Station to the Interagency Grizzly Bear Science Team (IGBST). Additional details may be developed through consultation with the USDI Fish and Wildlife Service.
11. When on USDA, National Forest System, or on DOI, Bureau of Land Management land, all existing and suspected bear activity and(or) conflicts are reported directly to the Forest Service or Bureau of Land Management contacts as well as APHIS Wildlife Services.
12. In an interagency agreement with the USDA Forest Service (USDA Forest Service 2007), the Sheep Station agrees they would comply with meeting grizzly bear management goals on the Meyers Creek and East Beaver Allotments including notifying appropriate personnel of encounters, and temporarily stopping or modifying grazing as necessary, should bear conflicts arise with humans or livestock.

Refer to the specific interagency agreement for details. This agreement may be updated based on future consultation between USDA Forest Service and the USDI Fish and Wildlife Service regarding use of the Meyers Creek Allotment. Refer to the most up to date interagency agreement for details.

Other reasonable and prudent measures may be developed as formal consultation with the USDI Fish and Wildlife Service proceeds.

Known Accounts of Past Interactions Between Domestic Sheep and Grizzly Bears

There have been very few grizzly bear/sheep encounters pertaining to Sheep Station grazing activities over the last 10 years despite the known presence of grizzly bears occupying the habitat. Encounters that did occur resulted in minimal loss of sheep, and ended after sheep were moved to a new location. APHIS Wildlife Services investigations of the incidents reported the possibility that the most recent encounters may have been black bears. No grizzly bears are known to have been killed, captured, or relocated from ARS properties or from Sheep Station activities on adjacent National Forest System Lands (Meyers Creek Allotment) and conflicts ended when sheep were moved.

In the past five years, there have been no reported grizzly bear/livestock conflicts on the Meyers Creek Sheep allotment of the Caribou-Targhee National Forest (Schwartz et al. 2008 in habitat monitoring report section; Farr 2008 and 2010, Personal Communication; Sheep Station personnel 2008, personal communication; Lewis 2011, personal communication).

A review of APHIS monitoring reports between 2002 and 2008 as well as personal communications with APHIS Wildlife Service officer (Farr 2008, 2010) indicate a total of four known grizzly bear-livestock encounters on ARS properties.

Two grizzly bear encounters were reported in 1985 and 1999 and ended without grizzly bear mortality or control actions (Farr 2008, personal communication). To validate that these previous encounters did not result in direct or indirect grizzly bear mortality, the project biologist reviewed Gunther et al. 2004, which documents the location of all known grizzly bear mortality between 1992 and 2000. The biologist also contacted the Interagency Grizzly Bear Science Team for a map of grizzly bear conflicts and mortality from 1975 through 2009 (Haroldson 2010, personal communications). These references confirm that no sheep related grizzly bear mortality occurred in the area. Two mortalities did occur in 1981 and 1984 near the Meyers Creek Allotment on National Forest System Lands. According to Haroldson "There was no evidence that the 1981 and 1984 mortalities were associated with sheep. The 1981 event was claws only recovered. The 1984 event was a bear shot and left in the fall."

In 2007, in the Odell pasture of the West Summer Range, presence of a grizzly bear at a ewe sheep carcass was confirmed on August 2, but evidence was insufficient to verify loss attributable to grizzly bears; black bears were possibly involved (Farr 2010). When another ewe was killed on August 6th in the Odell Pasture, APHIS Wildlife Services (Idaho) consulted with APHIS Wildlife Services (Montana) to verify if they were eligible to conduct work on grizzly bears under Montana's documentation and establish protocol for involving Montana Fish, Wildlife and Parks personnel. Grizzly bears were not a listed species at the time. No follow up control action was taken. On August 20 in the Odell pasture, the Sheep Station had moved sheep to a different grazing unit for 'scoring' (weighing lambs) and returned briefly to the unit adjacent to where suspected bear predation had been occurring. The herder found remains of five ewes that had been depredated earlier in the season, but these were too far decomposed to establish cause (Farr 2010). A total of seven sheep had been killed. No further encounters occurred in 2007, nor were there any grizzly bear control actions taken on nearby adjacent lands.

On July 28, 2008 Sheep Station personnel reported encountering a grizzly bear in the Big Mountain pasture of the West Summer Range. Investigation by APHIS Wildlife Services found evidence of both

grizzly bear and black bear in the vicinity. On August 1st, in the Big Mountain grazing unit, the herder encountered a bear again. One ewe was found killed, possibly by black bear (Farr 2010). No further encounters occurred in 2008, and no encounters occurred in 2009 or 2010.

Results of Telemetry Data for Grizzly Bear Use of ARS Properties

Grizzly bear telemetry data has been collected by the Interagency Grizzly Bear Study Team at various levels since 2001 (provided by Haroldson, unpublished data). A summary of those data collection points within ARS properties as well as on the National Forest System Meyers Creek Allotment showed the following:

- A total of five different collared bears used ARS properties and National Forest System Meyers Creek Allotment since 2001.
- Most use was of short duration (one or two days).
- One bear (#387) was located on the Sheep Station West Summer Range during a 12 day period in 2001.
- Another bear, (#419) was located on multiple properties in 2005 covering a span of 61 days, then was located on ARS properties for only three days in 2006.

Grizzly Bear Direct/Indirect Effects

Alternative 1(Proposed Action) and Alternative 5

- Alternative 1 represents current operations at the Sheep Station.
- Alternative 5 represents grazing operations without using BLM Bernice Allotment or National Forest System Snakey/Kelly allotment.
- The effects of these alternatives are nearly the same since grazing operations in or near occupied grizzly bear habitat are similar between the alternatives.

Alternatives 1 and 5 Direct/Indirect Effects for Grizzly Bear

To evaluate the potential and degree of effects to grizzly bears from the proposed activities, a variety of pertinent literature was reviewed. They included *Grizzly bear-human conflicts in the Greater Yellowstone ecosystem, 1992-2000* (Gunther et al. 2004), *Yellowstone Mortality and Conflicts Reduction Report* (Interagency Grizzly Bear Study Team 2009), *Bear - Sheep Interactions on the Targhee National Forest* (Jorgensen 1983), *Sheep Losses on Grizzly Bear Range* (Johnson and Griffel 1982), *Does Aversive Conditioning Reduce Human-Black Bear Conflict* (Mazur 2010), *Feasibility of Using Portable Electric Fencing to Prevent Damage to Livestock and Apiaries by Bears and other Predators* (Debolt 2000), and the *Biological Evaluation and Wildlife Specialist Reports for Meyers Creek Grazing Allotment* (Aber 2007). A synthesis of the information in these documents and known encounters related to Sheep Station activities indicates that there is a likelihood that grizzly bear/sheep conflicts would occur during the 10 year period being considered for the project proposal. However, the number of conflicts that might occur in any given year is few. A projection of zero conflicts in most years, and up to three conflicts in occasional years will be used as an estimate for further analysis and is based on the previous number of encounters on ARS properties and an expanding population. The potential for those conflicts leading to injury, harm, or direct or indirect mortality to grizzly bears is minimal with reasoning described below.

The documents mentioned above describe fundamental biology of the grizzly bear and the importance of high calorie food sources, particularly important during August and September when bears are building fat reserves in preparation for winter denning. Since grizzly bears are opportunistic, they are known to scavenge or pray on easily available foods, including livestock, which places them in direct conflict with man and possibly leading to eventual mortality in defense of property, livestock, or human safety. Similarly, a concern has also been brought up during conferencing with the USDI Fish and Wildlife Service that bears to some extent may alter their feeding behavior in search of readily available livestock. For the purposes of this analysis, injury or harm would be considered a grizzly bear becoming food conditioned. Food-conditioned bears may become habituated, leading to a loss of avoidance behaviors (Mazur 2010). A food conditioned bear is more likely to periodically recheck areas where it successfully found food, and also has the potential to associate the presence of man/sheep as a food reward. Once a bear is food conditioned, there is an increased risk of human/bear conflicts, and associated mortality from control actions that may result. Also, there could be some displacement of bears from active grazing areas if repeated hazing occurs.

Over the 10-year period for which the project decision would be valid and assuming continued expansion of bear populations and habitat use, there is some likelihood that an individual bear may become habituated/food conditioned. Although the number of repeat visits to a food source cannot be precisely determined before food conditioning has occurred, this analysis will assume that three or more visits to the same food source (similar to Mazur 2010) indicates that food conditioning/habituation is potentially occurring. If this happens, negative effects to grizzly bears could occur through three primary avenues:

1. A food conditioned bear could become a sheep killer, first attacking sheep associated with the Sheep Station, then progressing to other sheep on adjacent lands and not associated with Sheep Station activities. Although the Sheep Station proposed action indicates they would move sheep from the area and not request control actions, indirect effects could occur if adjacent private ranchers or other agencies experiencing problems from the food conditioned bear seek control measures eventually resulting in bear removal. This condition is not yet known or suspected to occur in association with Sheep Station activities.
2. Another scenario of possible negative effects is if a grizzly bear becomes food conditioned, and continues to repeatedly follow Sheep Station sheep around the properties rather than pursuing natural food sources. The resulting change in habitat use could be considered harm (USDI Fish and Wildlife Service communications). This condition is not yet known or suspected to occur in association with Sheep Station activities.
3. A third scenario of possible negative effects would be if Sheep Station personnel (sheep herder) shoots a grizzly bear in defense of his life and causes direct harm or injury to the bear and its young. This condition has not occurred, nor is it expected to occur in association with Sheep Station activities. Killing of a grizzly bear in defense of life is not considered part of the proposed action.

Although the literature suggests there is a possibility of the negative effects described above, there are a number of items indicating the likelihood of these effects occurring is low, and if they were to occur, the degree to which individual bears or the population would be affected is minimal.

Bear Encounters and Resulting Bear Mortality

There have been very few grizzly bear/sheep conflicts as a result of Sheep Station grazing activities over the last 10 years despite the known presence of grizzly bears occupying the habitat. Encounters that did occur resulted in minimal loss of sheep, and ended after sheep were moved to a new location. APHIS Wildlife Services investigations of the incidents reported some probability that the most recent encounters may also have been black bears. No grizzly bears are known to have been killed, captured, or relocated

from ARS properties or from Sheep Station activities on adjacent National Forest System lands (Meyers Creek Allotment) and conflicts ended when sheep were moved. This indicates that food conditioning/habituation has not been occurring from Sheep Station activities, grizzly bears have not been removed or killed as a result of Sheep Station activities, and this trend is likely to continue.

Sheep Herding Practices

Sheep herding practices on ARS properties are implemented at a high quality standard and have been effective to date at minimizing the number of encounters and avoiding harm to grizzly bears. Herders are required to be on site with the sheep band full time, including camping adjacent to the sheep bed grounds and keeping 4 dogs (2 guard dogs/2 herd dogs) with the band. Lame sheep, carcasses and trash are removed during camp tender visits which occur every three days. Sheep are moved to new bed-grounds every three to five days. Sheep are kept in fairly tight bands so the herder has close watch over their health. The Sheep Station would move sheep within and outside of properties to avoid repeated encounters (avoid food conditioning), and herders carry bear spray as a first measure of protection against bears. They are trained annually and advised to avoid grizzly bear encounters if at all possible. Good herding practices and temporal movements are recommended as effective ways to reduce bear-sheep conflicts and ultimately bear mortality in Jorgensen (1983), and Gunther et al. (2004). Similarly, Johnson and Griffel (1982) indicated the importance of livestock permittees willing to deal with problems cooperatively and positively. This willingness is demonstrated by the Sheep Station commitment to the conservation measures in the proposed action. Johnson and Griffel also noted that allotments with grizzly bear depredation typically had a high amount of stray sheep and frequent small scattered groups of sheep which is contrary to the methodology used by the Sheep Station. In further support of Sheep Station practices, the Biological Evaluation for Meyers Creek grazing allotment (Aber 2007) concluded that the Sheep Station has had an excellent record of avoiding conflicts with bears for many years and that there is no reason to assume this record would change in the future.

Movement of Sheep

The proposed project employs a conservation measure of moving sheep frequently to new bedgrounds, and the ability to move sheep to entirely different pastures or properties if repeated bear -sheep conflicts develop. Jorgensen, 1983 studied bear and sheep interactions on the Targhee National Forest and showed that such movements reduced contact potential between bears and sheep, decreased resulting depredations, bears did not follow sheep, nor did the presence of sheep influence a bears homerange. Similarly, Knight (1983) found that grizzly bears that killed sheep were not exclusive to killing sheep, and had normal feeding habitats and behaviors similar to those of other bears monitored. Considering that the Sheep Station is willing to move sheep regularly in order to minimize potential contact, and to move sheep to a different pasture or property before repeated grizzly bear conflicts develop, the overall risk of food conditioning and resultant harm to grizzly bears is low.

Poaching by Herders

Knight (1983) estimated that a substantial amount of grizzly bear mortality might occur from unreported sheep-grizzly bear conflicts and subsequent poaching of grizzly bears (by sheep herders) in order to reduce economic losses. To some extent, the belief that this still occurs and is applicable to the Sheep Station activities persists in the small towns and restaurants that surround the Centennial Mountains. While poaching by private sector sheep herders may have been a substantial mortality factor during the time of the original study (1970s) it is unlikely to occur today regarding Sheep Station activities. Sheep herders for the Sheep Station are documented workers employed by the US government, are trained in grizzly bear/black bear identification, are issued instructions to avoid all contact with grizzly bears if possible, carry pepper spray as a first line deterrent against bears, and gun ammunition is kept as

inventory. They are made aware that strict penalties may be incurred if grizzly bears are harmed without an immediate threat to life, and that any grizzly bear encounters are to be reported to their supervisor. Although private ranches and sheep herders may have had an economic incentive to poach grizzly bears when the species was newly listed, the Sheep Station and its employees have no such incentive and have much to lose. As such, the likelihood of a sheep herder engaging in poaching of grizzly bears is negligible and is not expected to occur.

Effects over a 10 year period

The likelihood of negative effects to grizzly bear in any given year is low. Injury or harm to grizzly bears would not occur due to mere presence of a grizzly bear on the property; or even if there is a limited number of conflicts between grizzlies and the sheep. Harm would occur if grizzly encounters progress into repeated conflicts, which is unlikely unless the Sheep Station is unresponsive in moving sheep when conflicts occur. It is unlikely in the short term based on the limited number of previous encounters and because conservation measures including willingness to move sheep to avoid repeated conflicts. However, it is reasonable to expect that a small negative effect described previously may eventually occur because of continued grizzly bear expansion into suitable habitat, the continued presence of sheep within that occupied grizzly bear habitat, the opportunistic nature of grizzly bear feeding, and the total number of years which the activity is being analyzed. Gunther et al. (2004) found that one grizzly bear was killed for every 39 sheep incidents. The Sheep Station had a total of 5 grizzly bear/sheep encounters over a two year period (2007 and 2008) which represents a period where they had more grizzly bear encounters than typical. Therefore, a projection of three encounters per year, over a ten year period, will be used to account for an expanding grizzly bear population while considering the low number of historical encounters on the Sheep Station which peaked in 2007 and 2008. Using this assumption, there would be approximately 30 sheep incidents over the 10 year period of the project, which is less than the reported rate of 39 bear/sheep incidents for each bear mortality reported in Gunther et al. (2004). Considering that harm, if it occurs, could include a female with dependent young, it can be concluded that Sheep Station activities could result in negative effects to between zero and five grizzly bears over the next 10 year period[12]. These effects, which may or may not occur, are small in comparison to estimated population size of the Yellowstone distinct population segment of grizzly bears of over 500 animals; population increases between 4 and 7 percent annually; and known and probable grizzly human caused grizzly bear mortality of approximately 30 bears annually, predominately associated with big game and black bear hunting seasons (estimated near 50 percent (in 2008 and 2009 annual reports)). Gunther, 2004 acknowledges that control actions between 1992 and 2000 did not affect the population to a degree that affects recovery.

Effects to grizzly bears from predator control activities are non-lethal and limited to occasional hazing of bears before they habituate to domestic sheep. As mentioned previously, herders are instructed to avoid all encounters if possible, move sheep within the pasture, and move sheep to other pastures if problems persist within a given area. On rare occasion, if sheep are being directly threatened, herders may fire rounds into the air in order to scare a grizzly bear away from the herd. There is no evidence to suggest that rare occurrence of this hazing would affect the grizzly bears ability to inhabit the landscape or raise cubs. If encounters continue, sheep would be moved out of the pasture or grazing unit to prevent continued losses to livestock and to prevent the need for lethal control measures. Herder's ammunition is accounted for, indicating that they have an incentive to address problem carnivores in a manner consistent with Sheep Station policy. All grizzly encounters are reported immediately to the herder's supervisor who contacts USDA Wildlife Services for additional investigation if needed. Through established Memoranda of Understanding, Wildlife Services contacts Idaho/Montana state wildlife agencies and/or USDI Fish and Wildlife Service.

[12] Three types of negative effects were described previously.

There would be no effects to grizzly bear genetic diversity as demonstrated by several key points.

- First, as stated in the Final Rule to delist, current levels of genetic diversity are consistent with known historic levels and do not threaten the long-term viability of the species.
- Second, The Final Conservation Strategy (USDI Fish and Wildlife Service 2007b) includes the transplant of one to two effective migrants per generation if no movement or genetic exchange is documented by 2020.
- Third, grizzly bear mortality or change in habitat use would not occur from Sheep Station activities based on the history of only a few encounters that ended without incident, and conservation measures in place to reduce the potential of conflicts.

Considering these factors, it is expected that grizzly bear movement through the Centennial Mountains would not be limited by Sheep Station activities, and thus would not limit genetic exchange with other grizzly bear populations.

Grizzly Bear Alternatives 2 and 3 Direct/Indirect Effects

- Alternatives 2 and 3 affect grizzly bears similarly because grazing would not occur near currently occupied habitat.
- In alternative 2, no Sheep Station grazing would occur.
- In alternative 3, no Sheep Station grazing would occur on ARS properties or Meyers Creek allotment in the Centennial Mountains which is identified as biologically suitable and socially acceptable to grizzly bear occupancy (Schwartz et al. 2009 in the Habitat Monitoring Report section).

The intent of livestock allotment standard in the Final Conservation Strategy (USDI Fish and Wildlife Service 2007) would be fully implemented by eliminating sheep grazing on the last occupied sheep allotment (Meyers Creek) within the Primary Conservation Area. In these alternatives, presumably, the Meyers Creek allotment would become vacant and permanently close. Similarly, sheep grazing would be eliminated on the East Summer Range (Toms Creek), which is immediately adjacent to the Primary Conservation Area. The area is likely biologically suitable and socially acceptable to grizzly bear occupancy according to the Grizzly Bear Management Plan for Southwestern Montana (Montana Fish Wildlife and Parks 2002), though boundaries for such designation have not been formally identified in Montana. The potential for livestock/grizzly bear conflicts from the Sheep Station would be nearly eliminated in these alternatives since the predominant grizzly bear population is located within the Primary Conservation Area, and Sheep Station grazing would not occur within five miles of the Primary Conservation Area. Grizzly bear mortality from Sheep Station activities would not occur.

Grizzly Bear Alternative 4 Direct/Indirect Effects

- Alternative 4 was developed specifically to address public scoping comments related to sheep grazing within and adjacent to the grizzly bear Primary conservation Area. In this alternative, Sheep Station grazing and associated activities would not occur on the East Summer Range (Toms Creek) or on the National Forest System Meyers Creek allotment.

In regards to alternative 4, the intent of livestock allotment standard in the Final Conservation Strategy (USDI Fish and Wildlife Service 2007) would be fully implemented by eliminating sheep grazing on the last occupied sheep allotment (Meyers Creek) within the Primary Conservation Area. In this alternative, presumably, the Meyers Creek allotment would become vacant and permanently close. Similarly, sheep

grazing would be eliminated on the East Summer Range (Toms Creek), which is immediately adjacent to the Primary Conservation Area. The area is biologically suitable and socially acceptable to grizzly bear occupancy according to the Grizzly Bear Management Plan for Southwestern Montana (Montana Fish Wildlife and Parks 2002), though boundaries for such designation have not been formally identified in Montana.

Grizzly Bear Cumulative Effects

The spatial boundary for the discussion of cumulative effects for grizzly bears is the Greater Yellowstone Ecosystem, because it is the boundary for the Yellowstone Distinct Population Segment of grizzly bears, and, therefore, puts the potential effects in the context of grizzly bear recovery for the designated population. The temporal boundary is 10 years because projections beyond this time period are less likely to be accurate.

The expected level of the effects for the project would not contribute to overall cumulative effects in a way which is detrimental to grizzly bear recovery considering the following points:

- The Yellowstone Distinct Population Segment of grizzly bears continues to expand in both population size and distribution.
- No direct grizzly bear mortality is expected from Sheep Station activities, and the probability of food conditioning resulting in indirect grizzly bear mortality or removal is low. There is no expected loss of habitat or loss of use in existing suitable habitat. Effects would be limited to rare occasions when a lone bear or sow with cubs is temporarily hazed to stop an immediate threat to sheep or human safety.
- Occasional hazing of a bear and implementation of other conservation measures described previously would not measurably increase annual mortality or cause exceedance of mortality threshold described in the Final Conservation Strategy. Although mortality thresholds were exceeded in 2008 for the Distinct Population Segment, none of these mortalities were attributed to Sheep Station activities, and most were attributed to hunting related incidents (many related to black bear hunting). It is reasonable to conclude that management actions that reduce mortalities related to hunting incidents are a likely tool to minimize grizzly bear mortality and keep it below established thresholds.

Sheep Station activities are not expected to limit grizzly bear movement or occupancy in the Centennial Mountains, and similarly would not limit genetic exchange with other grizzly bear populations. This finding is based on a limited number of documented encounters, no previous control actions on ARS properties or Meyers Creek, no direct mortality as a result of Sheep Station activities, low probability of food conditioning resulting indirect mortality on adjacent lands, and large expanses of suitable habitat in the Centennial Mountains.

Climate change (warming) is expected to continue over the next decade and beyond, and, therefore, could be considered as a cumulative effect condition that might affect grizzly bears. Primary effects to grizzly bear regarding climate change trends are indirect, and related to losses of larger diameter white bark pine and its cone crop, an important food source for grizzly bears in the Greater Yellowstone Ecosystem.

Jean et al. (2010) demonstrated there appears to be a trend of dying whitebark pine in the Greater Yellowstone Ecosystem between 2007and 2010 from blister rust and mountain pine beetle. Similarly, Haroldson and Podruzny (2010) found that 2010 was a low cone production year and emphasize that grizzly bears eat more meat when production is low, there is an increase in hunter/grizzly bear conflicts, and that extensive areas of beetle-killed whitebark pine in the Greater Yellowstone Ecosystem may exacerbate this concern. Considering this trend, it can be expected that grizzly bears occupying the Sheep

Station and adjacent lands may increase their food search area, and the Greater Yellowstone Ecosystem would experience an increase in grizzly bear confrontation and hunter related bear mortality. However, Sheep Station domestic sheep grazing would not accelerate these rates of conflicts (or mortality), because strong measures are in place to reduce potential conflicts including tightly herded bands, full time herders, guard dogs, and the Sheep Station is willing to move sheep before habituation occurs. Also, the Sheep Station is not seeking removal of problem grizzly bears in any of the proposed alternatives, so no direct increase in mortality is expected.

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. The removal and closure of sheep grazing permits on Forest Lands inside the primary conservation area, is an interrelated action. Under this interrelated action, all domestic sheep grazing on National Forests inside the primary conservation area has been subsequently vacated and/or closed except for that occurring on the Meyers Creek allotment by the Sheep Station.

- Under the proposed action and alternative 5 the Meyers Creek allotment would continue to be grazed in its current fashion. However, continued grazing remains consistent with the Final Conservation Strategy (USDI Fish and Wildlife Service 2007), because the standard applies to permittees voluntarily withdrawing their grazing. Since grazing on Meyers Creek allotment is critical to the research mission of the agency as well as the grazing rotation schedule and movement of sheep, the US Sheep Experiment Station would not currently be considered a "willing" permittee.

- Under alternatives 2, 3, and 4, domestic sheep grazing in the Centennial Range would not occur so the interrelated action of removing all sheep grazing within the primary conservation area would be implemented.

The project would have "No Effect" on critical habitat as none is present or proposed within the project area.

Preliminary Grizzly Bear Biological Determination

This determination is preliminary. It will be finalized by the project wildlife biologist prior to implementation of the project decision. Discussions between the USDI Fish and Wildlife Service and the wildlife biologist have occurred on numerous occasions and will continue. Consultation would conclude after the biological assessment is finalized and signed, submitted to the USDI Fish and Wildlife Service for their consideration and (if/when) a biological opinion is provided.

The project biologist has determined that U. S. Sheep Experiment Station Grazing and Associated Activities Project - May affect, and are likely to adversely affect the Yellowstone Distinct Population of grizzly bear. This determination is applicable to the proposed action (alternative 1) as well as alternatives 4, and 5. Effects are similar in these alternatives. However, the potential encounters are further reduced in alternative 4. This determination is supported by rationale summarized below.

- No direct grizzly bear mortality is expected from Sheep Station activities. Neither lethal control or trap and transport will be implemented or requested under this proposal. Should the need arise for these abatement techniques related to grizzly bear, consultation would be reinitiated.

- Potential effects are the limited probability over a 10-year period that a grizzly bear (and/or cubs) become food conditioned to domestic sheep, change feeding behaviors, and confrontations develop on adjacent lands under other ownership. The resulting change in habitat use could be considered harm (USDI Fish and Wildlife Service communications). Also, indirect effects could occur if adjacent

private ranchers or other agencies experiencing problems from the food conditioned bear seek control measures eventually resulting in bear removal.

- The project would not limit grizzly bear occupancy or movement through the Centennial Mountains because grizzly bear habitat would not be reduced, and Sheep Station grazing practices include light utilization, for short duration, over a large landscape, with Summer Pastures rested one out of every three years. This grazing method prevents frequent and recurring encounters with grizzly bears which might otherwise alter bear behavior or necessitate the need for lethal control.

- Potential opportunities for genetic exchange with other grizzly bear populations would not be affected since occupancy or movement through the Centennial range would not be limited. In addition, recent evidence demonstrates that genetic diversity is not limiting Yellowstone distinct population segment grizzly bear populations in the short term, and that translocation from other populations is an adequate method to address genetic diversity shortfalls over the long term.

- Twelve conservation measures (described previously) are in place to ensure that Sheep Station activities continue to operate in a manner that minimizes the potential for encounters and effects to grizzly bears. These conservation measures include proactive measures to avoid conflicts (research design criteria, guard dogs, sheep herders, and storage/removal of attractants), annual training, policy to address encounters non-lethally (move sheep, haze only if necessary), and established communication processes with other agencies.

- There have been only a few encounters with grizzly bears in the past decade relative to Sheep Station activities. No grizzly bears have been killed, captured, or relocated from ARS properties or on National Forest System/BLM allotments in response to Sheep Station activities. It is expected this trend would continue.

- Sheep Station sheep grazing in the Meyers Creek Allotment was analyzed previously by the USDA Forest Service who found that the grazing has occurred there for decades with minimal conflicts, meets the standards and guidelines from the Grizzly Bear Forest Plan Amendment, and noted that "The permittees (Sheep Station) have had an excellent record of avoiding conflicts with bears for many years."

- The potential for livestock/grizzly bear encounters would be further reduced in alternative 4, since the predominant grizzly bear population is located within the primary conservation area, and Sheep Station grazing would not occur within 5 miles of the primary conservation area.

- The expected level of effects for the project are minimal, and would not contribute to overall cumulative effects in a way which is detrimental to grizzly bear recovery.

- The biologist has also determined that alternatives 2 and 3 would have "No Effect" on the Yellowstone distinct population segment of grizzly bears since Sheep Station sheep grazing activities would not occur in occupied grizzly bear habitat or alter habitat conditions.

Other Wildlife Species

The following section includes analysis of additional species of concern or their habitats, that are located on ARS properties, or that are located adjacent to or downstream of the project, and potentially could be affected by the project. A pre-field review of available information was conducted to assemble occurrence records, review habitat needs and ecological requirements, and determine what field reconnaissance was needed to complete the analysis. Sources of information included Idaho and Montana Natural Heritage Program databases, Idaho and Montana's Comprehensive Wildlife Conservation Strategy, Caribou-

Targhee National Forest Species Lists, and Personal Communications with biologists from Idaho Department of Fish and Game, Montana Department of Fish and Game, biologists from the Caribou-Targhee National Forest, biologists from Bureau of Land Management Upper Snake Field Office, and from comments received during scoping. The wildlife biologist visited the sites on May 6th through 8th, 2008 to conduct interviews and cursory field review. The biologist conducted an extensive field visit July 6th through 14th, 2008 verifying habitat types, habitat conditions, observing proposed activities, and gathering additional site information.

While the pre-field review generated an extensive list of species that may occupy habitats on ARS properties, this analysis narrows the focus to those species where valid concerns were identified during litigation, scoping, and pre-field/field review. Other species may be addressed in future analysis if new pertinent information becomes available indicating Sheep Station activities are of concern for that species or its' habitat. The additional species and analysis listed below (in addition to the threatened/endangered species analyzed previously) adequately address the intent of the settlement, and provides a thorough review of the effects to known biological resources and their habitats.

Gray Wolf (*Canis lupus*)

Gray Wolf Affected Environment

Effective May 5, 2011 the US Fish and Wildlife Service removed gray wolves in a portion of the Northern Rocky Mountain Distinct Population Segment (DPS) encompassing Idaho, Montana and parts of Oregon, Washington and Utah from the Federal List of Endangered and Threatened Wildlife. Gray wolves will remain listed under the ESA in Wyoming, although the Service is working closely with that state to develop a wolf management plan that would allow wolves in Wyoming to be removed from the list in the future (USDI Fish and Wildlife Service 2011). The Service and the states will monitor wolf populations in the Northern Rocky Mountain distinct population segment and gather population data for at least five years.

Recent History

The delisting of the northern Rocky Mountain gray wolf distinct population segment (DPS) originally took effect on May 4, 2009. On June 2nd, a coalition of 13 groups challenged the USDI Fish and Wildlife Service delisting decision in Federal District Court in Missoula (9th Circuit). On September 8th, 2009, the Court ordered that a motion for preliminary injunction be denied, indicating that the species will currently remain delisted, but that a separate order would follow to establish a dispositive briefing schedule and set a hearing on the merits of the complaint. The order to deny preliminary injunction is based largely on supporting evidence that the distinct population segment would not suffer irreparable harm from the 2009 wolf hunting seasons in Idaho and Montana, and that hunting would not impact genetic connectivity of the distinct population segment, assuming hunters manage to kill up to 330 wolves allowed in the quotas.

Because renewed legal challenges to gray wolf status are expected and may be lengthy, it should be noted that this project analysis is applicable to wolves as de-listed, or if returned to previous status of a nonessential experimental population. Nonessential experimental population status (as previously designated) would apply to all wolves in the southern half of Montana, all of Idaho south of Interstate 90, and all of Wyoming. The 2005 and 2008 Endangered Species Act nonessential experimental population regulations allow people to take wolves under certain circumstances, such as when wolves are in the physical act of killing, wounding, chasing, or molesting legally present livestock and dogs.

As summarized in the Montana Fish, Wildlife, and Parks Fact Sheet on Wolves (2011), "The northern Rocky Mountain gray wolf population first met biological recovery goals in 2002. The Northern Rockies

"metapopulation" is comprised of wolf populations in Montana, Idaho, and Wyoming. About 1,650 wolves live in the region, where wolves can travel about freely to join existing packs or form new packs. This, combined with wolf populations in Canada and Alaska, assures genetic diversity. Federal rules require Montana and Idaho to maintain at least 150 wolves and 15 breeding pairs in each state (as well as Wyoming). About 566 wolves inhabited Montana in 2010 in about 108 packs, 35 of which were breeding pairs." Similarly, about 835 wolves inhabited Idaho in 2009 in about 94 packs, 49 of which were documented breeding pairs (Mack et al. 2010).

The wolf is reclassified under Montana law as a "species in need of management" statewide. Montana laws and administrative rules protect wolves. Wolves can only be legally killed: during an official hunting season authorized by the FWP Commission; if the wolf is seen attacking or killing or threatening to kill dogs or livestock; to protect human life; or as authorized by FWP to resolve wolf-livestock conflicts. Montana is considering a wolf hunting season for 2011 to reduce the population by about 13 percent with a total harvest quota near 186 wolves.

In Idaho wolves are being managed as a big game animal. They are protected by state laws. The Idaho Fish and Game Commission approved 2011 wolf hunting season and wolf tags have gone on sale with quotas to be set at a later date.

Wolf Pack Locations near the Sheep Station

Two gray wolf pack territories are in the vicinity of, but not centered on, ARS properties including the West Summer Range (Odell/Big Mountain), East Summer Range (Toms Creek), Henninger Ranch, and Humphrey Ranch, which are all part of the ARS ownership in the Centennial Range. The Bishop Mountain Pack resides in Idaho nearest to the Henninger Ranch property and East Summer Range. The Henry's Lake pack resides in Idaho east of the East Summer Range (Toms Creek). These two wolf packs may occasionally occupy ARS properties in search of food, but denning or rendezvous areas are not known to occur there. In 2010 and so far in 2011, the Sheep Station has had no encounters or control actions with wolves from these packs (Lewis 2011, personal communications).

In 2009, two separate wolf packs denned in southwestern Montana near the Interstate 15 corridor in the vicinity of Humphrey Ranch property. They included the two border packs called the Sage Creek pack (Montana), and wolf group B394 (Idaho). These wolves no longer occur there as they were removed during animal damage control actions described below.

The following summary of activity was synthesized from several sources including the 2007 through 2010 gray wolf conservation and management annual reports (Sime et al. 2011, Nadeau et al. 2009, USDI Fish and Wildlife Service 2011, Idaho DFG Wolf Management Progress Report 2011, Montana FWP Wolf Weekly Reports 2010; and Meintz 2009, personal communications).

Sage Creek Pack and B394 Group

Until 2009, lethal control actions in response to wolf depredation on ARS properties has been uncommon, since most encounters are avoided through regular movement of sheep, and the full-time presence of guard dogs and sheep herders. On ARS properties, no trapping for wolves had occurred for several years preceding 2008 other than an incident three years prior. In that incident, encounters discontinued before any wolves were trapped.

In 2008 two wolf packs denned in Montana, but occurred on the border of Idaho/Montana near the Humphrey Ranch property, Interstate 15 corridor. They included the Sage Creek Pack (East of Interstate 15) and B394 group (west of Interstate 15). The Sage Creek Pack is a border pack between Montana and Idaho that formed in 2007. In 2008, based on livestock depredations on cattle from private landowners,

three wolves were lethally removed from the area. In 2008, wolf B394 (Idaho) was trapped and radio collared in response to depredations at the Sheep Station that resulted in 16 confirmed dead sheep. In January 2009, the B394 wolf was affiliated with an adult black wolf. In June/July/and August of 2009, numerous depredations occurred along the Interstate 15 corridor on livestock belonging to private producers as well as the Sheep Station. After investigation by APHIS Wildlife Services, the Idaho and Montana state wildlife agencies incrementally authorized removal of depredating wolves from the Sage Creek pack and wolves associated with the B394 group. Eventually, to address numerous and continuing depredations on private livestock as well Sheep Station livestock, all known members of the packs were removed. Control efforts were completed with the lethal removal of approximately ten adult wolves from the Sage Creek pack as well as wolf B394 and six pups. Both the Sage Creek pack and the group associated with B394 have been entirely removed.

Bishop Mountain Pack

The Bishop Mountain pack was an uncollared, suspected pack in 2007. Pack status was verified in February of 2008, when two wolves were darted from a helicopter and radio collared.

Three lethal control actions occurred in 2008, none were associated with Sheep Station activities. The Bishop Mountain pack was counted as a breeding pair in 2008 after four pups were verified in this pack, and aerial flights determined that the pack was comprised of at least five wolves. In 2009, the wolves with radio-collars could not be located. In 2010, one wolf, subadult male B485, was captured and radio-collared. A female from the Gibbon Meadows pack (Yellowstone National Park) joined the Bishop Mountain pack. A minimum of three pups was estimated through howling. A pack member was legally killed while harassing livestock in July 2010 not associated with Sheep Station activities. This pack was considered a breeding pair for 2010. The yearend minimum number of wolves detected was four.

Henrys Lake Pack

The Henrys Lake suspected pack (Idaho) was identified during the 2008 season, which indicated the likely presence of a new pack of seven wolves. In 2010, a photograph of two black pups, verified by Idaho program personnel, served as verification of breeding pair status for 2010. No year-end count was obtained.

Other Packs in Surrounding Areas

There is a history of additional wolf packs known previously to occur in the vicinity of the Centennial Mountains but typically found well outside of the ARS properties. Since wolves are known to have wide ranging habits, the status of these packs was briefly reviewed. Control actions were implemented on these packs to a varying extent but none involved Sheep Station activities.

Wolf Control Procedure

Radio collars, leghold traps, and/or aerial control are methods used on private and federal lands to track problem wolves/wolf packs and, if conflicts persist, implement lethal removal, which is usually targeted at offending animals (Farr 2008, Meintz 2009, personal communications). APHIS Wildlife Services acts on the behalf of the Sheep Station to verify livestock damage before any control actions are taken. If wolf damage is verified, APHIS Wildlife Services contacts his supervisor as well as the state wildlife agency to request authorization if it is necessary to pursue direct control. Authority for control actions are granted through state wildlife agencies (Arena 2008, Farr 2009, personal communications).

The following text describes the typical methodology of "Incremental Control Measures" referred to in other portions of this document. Effects to wolves involved in depredation scenarios generally occur in

three categories. First, if an individual wolf is involved in limited depredation such as while traveling through habitat to a new or different territory and no further incidents occur, non-lethal control measures (such as the presence of herders and guard dogs) are deemed adequate. Second, if offending wolves are part of a group, breeding pair, or pack and remain active in the vicinity, individual wolves may be radio-collared so activities can be monitored and tracked. If depredations continue, one to three animals are lethally removed, with the intention to target specific offending animals. If possible, the pack is left intact with a breeding pair. Third, if depredation is a recurrent problem and there are substantial livestock losses from a specific pack or group of wolves (including losses on private producers as well as Sheep Station livestock), authorization may be given to remove all or most pack members. This may involve individual trapping and/or aerial targeting (at the discretion of APHIS Wildlife Services and state agencies) to achieve removal of the breeding pair, pups, and other associated wolves.

Gray Wolf Direct/Indirect Effects

Alternative 1, 4, and 5 Direct and Indirect Effects for Gray Wolf

Effects from activities in these three alternatives are essentially the same since each proposes similar livestock grazing in the Centennial Mountains where wolves are known and expected to occur. Alternative 1 proposes grazing in both the East and West Summer Ranges. Alternative 4 proposes grazing in the West Summer Range while discontinuing grazing in the East Summer Range and USDA Forest Service Meyers Allotment. Alternative 5 continues grazing in both the East and West Summer Ranges while discontinuing grazing from Snakey/Kelly and Bernice allotments. Potential effects to wolves remain the same throughout each alternative, because each alternative continues grazing in occupied wolf habitat.

A review of the activities described in these alternatives indicate that activities would have effects on gray wolves and their habitat. Specifically, the activities that would have some effects can be categorized and described as follows:

1. Trailing, grazing, and camp tending activities in the Centennial Mountains have previously, and would continue to result in occasional encounters with wolves. The habitat is occupied by deer and elk (a natural food source for wolves), and the addition of sheep bands would, on occasion, attract wolves opportunistically searching for food, or wolves habituated to sheep as an easy food source. Mitigations including the presence of full-time sheep herders, guard dogs, and herd dogs provide consistent and effective methods of non-lethal control, which in-turn discourages most individual wolves and wolf packs from habituating to Sheep Station sheep herds as a food source. In addition, on a daily basis, herders keep a daily count on sheep, and ride trails to gather strays. Dead or injured sheep are removed from the field when possible, or treated with lime and/or buried to render the carcass unavailable as a food source. As a result, the effect of attracting wolves to domestic sheep as a potential food source is substantially reduced because of continual human presence, guard dog presence, and by reducing the number of stray sheep, or dead sheep available as a food source. The overall direct and indirect effect to wolves from these activities is minimal. Effects of harassment and predator control activities (such as firing gun shots in the air and other abatement tools) are discussed separately in number 3 below.
2. Activities that could affect daily or annual movements of wolf prey (deer, elk, and moose) also have the potential to indirectly effect gray wolf movements. Prescribed fire may improve range conditions such as increased vigor on the annual growth of shrubs and grasses, which correspondingly attracts more ungulates. Thus, wolves could be indirectly attracted to areas with prescribed fire, in search of big game food sources concentrated near productive foraging habitats. Prescribed fire is occurring on the Headquarters property, which is big game transitional range. Since this area is covered in snow

much of the winter season, its capacity to support deer and elk in large concentrations is minimal, and its corresponding potential to affect gray wolf is even smaller and limited to a short duration as ungulates migrate through the area to different elevations. Maintenance of fire breaks and roads on the ARS properties could temporarily have small effects on deer and elk herd movements, where the ungulates avoid mechanized operating equipment. However, these effects are limited to times when heavy equipment is operating in the area. With a lack of public motorized access to roads on the Sheep Station, big game persists with minimal disruption across the landscape, which translates to few or no corresponding impacts to wolves. Water developments that occur in the Big Mountain grazing unit may occasionally attract deer, elk or moose, but these occasions are rare since ungulates more likely use natural water sources. Fencing on ARS properties at lower elevations is constructed to specifications that do not limit travel for ungulates, and upper elevation fencing (horse corral) is temporary, small in size, and is not big enough to substantially affect big game movements. The one large fence present on ARS properties near the Headquarters (coyote fence) does eliminate big game access to forage on approximately 640 acres. Since the fence is in low elevation sagebrush that does not include any mapped wetlands or unique wildlife habitat features, and is surrounded by thousands of acres of similar habitat, the fence does not limit ungulate use across the landscape or their access to limited habitats. As a result, effects would be limited to the loss of a small amount of available forage for deer and elk, a local change in daily movements of deer and elk around the one square mile exclosure, and ultimately, little or no corresponding effect to wolves.

3. Effects to wolves are expected from predator control activities on ARS properties including non-lethal measures such as hazing, lethal removal of individual animals, and in some cases, particularly when depredation to private livestock is also occurring, removal of entire packs and/or breeding pairs. The history of minimal conflicts with wolves on the Sheep Station before 2008, and the incremental control measures that resulted in the removal of two packs in 2009 near Humphrey Ranch, indicate that control measures are likely to vary from year to year. In most years, such as occurred in 2005 through 2008, non-lethal activities including having sheep herders and guard dogs with sheep, hazing individual wolves during encounters, and trapping/radio collaring individual wolves would be adequate to address depredation on Sheep Station herds. Despite proactive conservation measures to reduce conflicts, in some years packs would establish and/or expand in or near the Centennial Mountains, and depredate more heavily on livestock from the Sheep Station as well as adjacent private producers. In these cases, lethal control measures would be necessary to curtail depredation on Sheep Station sheep and/or prevent a pack from habituating to domestic sheep. Lethal removal would be implemented typically on one to three wolves. In uncommon circumstances such as occurred in 2009, when numerous depredations continue on private and Sheep Station livestock, control actions could continue in an incremental fashion until an entire offending pack is removed, varying between three and ten animals. At the legal discretion of USDI Fish and Wildlife Service, Idaho/Montana Wildlife Agencies, and APHIS Wildlife Services (depending on current listing status), incremental control measures would continue to be authorized, to a varying degree, resulting in the removal of individual wolves, breeding pairs, and on occasion, established packs.

Overall, the effects described above are not expected to affect the delisted status of gray wolves nor reduce the population or number of breeding pairs near the threshold of 150 animals and 15 breeding pairs in each state.

Alternatives 2, 3 Direct and Indirect Effects

- Alternative 2 and 3 affect gray wolves similarly because all Sheep Station grazing activities in suitable wolf habitat would be eliminated in the Centennial Range.

- In alternative 2, no Sheep Station grazing would occur.

- In alternative 3, no Sheep Station grazing would occur in the Centennial Mountains

Elimination of all Sheep Station grazing and associated activities (alternative 2), or all Sheep Station grazing activities in the Centennial Range (alternative 3) would eliminate the Sheep Station role in potential effects on wolves discussed in the earlier alternatives. Livestock grazing on ARS properties which otherwise may have resulted in lethal control actions to remove a few individual wolves annually, or in some years, up to two wolf packs or groups that are establishing, would not occur. However, control actions related to private livestock owners and USDA Forest Service/Bureau of Land Management Permittees in and adjacent to the Centennial Range would continue in its current fashion. It is unknown if new resident wolf packs would naturally reestablish, or if other control actions related to private/permitted producers would limit pack establishment on the Centennial Range.

Gray Wolf Cumulative Effects

The spatial boundary for the discussion of cumulative effects for wolves is the Centennial Mountain Range to the I-15 corridor because this area is:

- Large enough to sustain one or more wolf packs,
- Is influenced by (or influences) wolf management on adjacent lands under other ownership, and
- Is an important piece of undeveloped habitat between the Greater Yellowstone Ecosystem and Central Idaho.

The temporal boundary is 10 years because projections beyond that point are similar to those being discussed, but become less accurate over time.

The project is not expected to add cumulative effects detrimental to wolf recovery based on the following information:

- Hunt season quotas for 2011 are currently being developed in Idaho and Montana. Hunting seasons are managed on an annual quota basis by state wildlife agencies, who point to evidence that such management would not detract from sustaining the current population, and that genetic connectivity would not be impacted, even if the maximum quota animals is reached. On September 8, 2009, Judge Molloy (Missoula) denied a request for a preliminary injunction based on a lack of evidence of irreparable harm to the wolf from the 2009 wolf hunting season in Idaho and Montana.
- The Northern Rocky Mountain Wolf population is expanding in both size and distribution, and a limited number of wolves or packs have been or would be impacted by continued operations on the Sheep Station.
- State wildlife agencies have the authority to authorize or deny lethal control actions on private or agency lands, thus procedures are in place to balance lethal control actions with larger population/pack management goals in the Centennial Mountain Range.

Rocky Mountain Bighorn Sheep (*Ovis canadensis canadensis*)

Rocky Mountain bighorn sheep are not known or expected to be present on ARS properties. Bighorn sheep in Idaho and Montana portions of the project area have no federal listing status, and are managed as game species with controlled hunting allowed in certain areas. Bighorn sheep herds nearest to ARS properties are in Montana, approximately 20 miles removed from all Sheep Station activities such that interactions are not a concern with these herds. Two small herds from prior bighorn sheep reintroductions

are present in the Upper Snake region of Idaho near the Snakey/Kelly allotment (National Forest System) and the Bernice allotment (Bureau of Land Management). The specified actions included in the Bighorn sheep Action Plan section of the BLM/Sheep Station Memorandum of Understanding are reasonable measures put in place to minimize the potential for interactions between domestic sheep and bighorn sheep in these areas.

Rocky Mountain Bighorn Sheep Affected Environment

In the Rocky Mountain west, a primary issue regarding bighorn sheep and domestic sheep interaction revolves around die-offs within native or transplant bighorn sheep herds, after coming in contact with domestic sheep. The issue has been largely polarized by evidence that domestic sheep diseases threaten the persistence of bighorn sheep populations, economic and social consequences of restricting domestic sheep grazing are substantial, and the effectiveness of maintaining separation between domestic sheep and bighorn sheep is debated. In examples such as occurred near Hell's canyon in Western Idaho, where one or more bighorn sheep became infected with pneumonia (*Pasteurella* or *Manhiemmia*), the pneumonia spread to other members within a bighorn sheep herd, and a portion of the bighorn sheep herd died. The majority of documented bighorn sheep die-offs follow contact with domestic sheep. Clifford et al. (2009) and Lawrence et al. (2010) demonstrated the transmission of *Mannheimia haemolytica* bacteria from domestic sheep resulted in the pneumonia and death of bighorn sheep under certain controlled conditions.

In contrast, in field situations, it isn't known if sufficient contact for a transmission event occurs under existing grazing conditions, and pneumonic disease in bighorn sheep has also been reported in the absence of detectable contact with small ruminants (Knowles2008, personal communication). Knowles describes the following events that must come together to infect bighorn sheep:

- A domestic sheep must be infected with appropriate organisms;
- The domestic sheep must be shedding these organisms in sufficient quantity for transmission;
- Due to the nature of the suspected organisms, mucosal contact must occur and match in time with the dose being shed for transmission and infection, and
- The bighorn sheep must become infected and replicate the organism(s) in sufficient quantity to both transmit and to reach other organ systems to cause disease.

Each of these steps has a probability associated with them, and regarding the limited overlap of Sheep Station grazing near bighorn sheep habitat, it is in question whether these events would occur in a quantity high enough to lead to disease and/or a further transmission event. Knowles (2010) also submitted a letter to the Payette National Forest clarifying that the study by Lawrence et al. (2010) indicates that "even extended fence line contact of 2 months didn't lead to disease and death" in bighorn sheep until 48 hours of confined co-mingling occurred. He concludes that the data from Lawrence et al. shows that transmission of *Mannheimia haemolytica* between domestic and bighorn sheep is a complex concept, requires extended periods of time, and doesn't necessarily lead to disease without confined co-mingling. Therefore, details of contact should be incorporated into management plans and risk models.

Payette National Forest Decision

State and Federal Agencies across the Western United States are modeling bighorn sheep habitat and updating herd distribution based on models used for the Payette National Forest. In 2010 the Payette National Forest made a decision to discontinue sheep grazing in a number of areas where bighorn sheep use and domestic sheep use overlap. This decision was based on extensive modeling of observed bighorn sheep use and available habitat. The models predicted core herd home ranges with 95 percent confidence,

a foray analysis, and summer source habitat. These models were then used to predict potential effects on a larger metapopulation of bighorn sheep made up of the smaller subset of herds and their potential interactions. The analysis and decision was completed to ensure compliance with regulations including National Forest Management Act, Hells Canyon National Recreation Area Act, and USDA Forest Service Sensitive Species Policy.

Since the Sheep Station is approximately 200 miles east of the Payette NF, the modeling process and effects analysis used on the Payette National Forest was reviewed. However, little to no telemetry data exists for bighorn sheep in the project area, and, therefore, core herd home ranges, foray areas, and metapopulations cannot be accurately delineated in order to assess risk. In lieu of this information a number of other sources were considered in order to accurately portray the existing condition and potential effects.

Idaho Department of Fish and Game (IDFG) Bighorn Sheep Management Plan

Idaho has drafted source habitat maps and Bighorn Sheep "Population Management Units" (PMU) which are displayed in the Idaho Department of Fish and Game Bighorn Sheep Management Plan, 2010. This data was considered in the Sheep Station analysis to better identify which bighorn sheep herds might be affected and where potential habitat or occupied habitat occurs. Idaho Department of Fish and Game population management units were formulated from opportunistic bighorn observations, potential suitable habitats and game management boundaries. It should be noted that population management units are general estimates of potential herd use and do not equate to core herd home ranges used in the Payette analysis which predicts bighorn sheep occupancy with 95 percent confidence based on telemetry information.

Bighorn Sheep Herd Information

ARS properties in Idaho are within Idaho Game Management Unit 61 of the Upper Snake Region. A small population of bighorn sheep occurs on the Idaho-Montana border in the Lionhead area of Idaho Game Management Unit 61. In Montana, this bighorn herd is known as The Hilgard herd, Montana Hunting District 302, with an estimated population of 105 animals, and a population goal of 100. The herd has limited available winter range, thus the Montana Fish Wildlife and Parks goal is to manage the herd at current levels. The herd is separated from the East and West Summer Ranges which include Odell Creek, Big Mountain, and Toms Creek grazing units by a distance of approximately 20 miles, Henry's Lake basin, and substantial geographic topography along the continental divide. Although the Idaho Bighorn Sheep Management Plan delineates the Lionhead population management unit closer to ARS property, there is no indication that a herd occupies the area adjacent to Toms Creek and-or Odell Creek grazing units. Neither the Idaho Fish and Game Bighorn Sheep Progress Report (2009) nor the Montana Draft Bighorn Sheep Strategy (2009), or the Idaho Bighorn Sheep Management Plan (2010) suggests any known interaction between the Hilgard/Lionhead herd and Sheep Station grazing activities. According to the Idaho Fish and Game Bighorn Sheep Progress Report, 12-15 sheep are seen in Idaho during the summer months.

Bighorn sheep populations in other adjacent areas of Montana, which are also outside of ARS properties, include the Tendoy Mountain herd, over 20 miles to the northwest of the Humphrey Ranch. The herd is in Montana Hunting District 315, with an estimated population of 59, and a population goal of 200. It is currently closed to hunting until objectives are achieved.

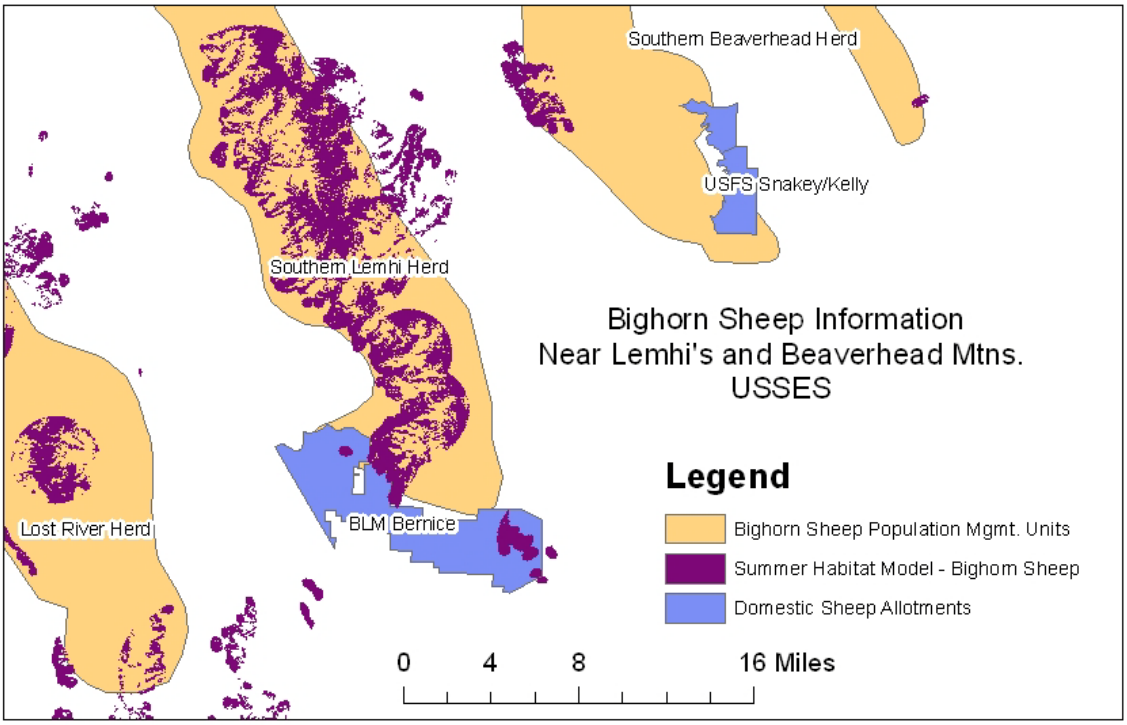

Figure 43. Bighorn sheep Idaho herd boundaries and modeled summer habitat near Snakey/Kelly and Bernice grazing allotments used by the Sheep Station[13]

The Sheep Station also grazes sheep on National Forest System and Bureau of Land Management allotments (Snakey/Kelly and Bernice respectively). A review of the 2009 Idaho Progress Report indicates that:

- In the Lemhi Range, the Bernice BLM domestic sheep allotment on the Little Lost River side of the range overlaps with bighorn sheep range within Idaho Game Management Unit 51.
- In the Beaverhead Range, the Snakey Canyon domestic sheep allotment (USDA Forest Service) overlaps with bighorn sheep range in Idaho Game Management Unit 59a.
- Observations of 30 bighorn sheep in the Lemhi range and nine bighorn sheep in the Beaverhead range occurred in 2007.
- There is no documented interaction/contact between domestic sheep and bighorn sheep on these allotments. However, there was one incident where a stray domestic sheep was observed three linear miles from bighorn sheep and a Sheep Station employee subsequently removed the domestic sheep.

Lemhi Bighorn Sheep Survey

The USDA Forest Service and the BLM are cooperating in a Bighorn Sheep Survey of the Lemhi Mountain Range (2010/2011). The 2010 progress report for these surveys (Akenson and McDaniel 2010) state that bighorn sheep occupy lower elevations in the southern Lemhi Mountains than previously expected, and that "domestic grazing allotments located on BLM land, adjacent to the USDA Forest Service lands on the southern Lemhi Range, are the primary points of domestic - wild sheep interaction

[13] Based on Peyette Summer Habitat Model used in IDFG Bighorn Sheep Mgmt. Plan

and potential disease transfer." The report also notes that there was a positive response (increase) to the bighorn sheep on the adjacent Lost River Range after removal of adjacent domestic sheep grazing allotments.

BLM Bernice Allotment Memorandum of Understanding (MOU)

In an MOU prepared between the Bureau of Land Management and the Sheep Station for grazing on the Bernice allotment (USDI Bureau of Land Management 2007), a "Bighorn Sheep Action Plan" is included. The action plan describes five action items that will be taken in order to minimize potential contact between bighorn and domestic sheep. They include:

- On- site supervision of the domestic sheep bands as well accompaniment by guard dogs to prevent interaction.
- Keeping domestic sheep below the 5,600 foot contour and off of mountain foothills and canyons.
- If funding is available, cooperation regarding data collection for bighorn sheep surveys.
- Maintaining a three-mile buffer of separation between domestic sheep and bighorn sheep.
- Notifying a list of individuals if contact occurs or becomes imminent.

These action items are consistent with Idaho's *Interim Strategy for Managing Separation between Bighorn Sheep and Domestic Sheep in Idaho* (Idaho Department of Fish and Game 2007b) and are similar to the concept of watch zones and response plans described in the *Idaho Bighorn Sheep Management Plan, 2010*.

Documentation of Stray Domestic Sheep

There have been several recent incidents documented where stray domestic sheep from the Bernice allotment overwintered in areas of the southern Lemhi Range for several months (Foster 2011, Personal Communications). In these observations, individual domestic sheep were seen moving to higher elevation habitat that overlaps bighorn sheep winter and spring habitat such as in Black Canyon. In April 2011, after a number of stray domestic sheep were observed in the southern Lemhis throughout the winter, five domestic sheep having US Sheep Station ear tags were lethally removed from the area in a cooperative effort between Idaho Department of Fish and Game, the Sheep Station, and BLM personnel.

Other

Based in part on a meeting at USDA Forest Service Headquarters in Washington D. C., the Agricultural Research Service is exploring ways to enter into collaborative research with the USDA Forest Service (Knowles 2011, personal communication). This collaboration with USDA Forest Service is to examine the risk of contact between domestic and bighorn sheep. The Sheep Station is a critical component of this research effort because grazing lands for the Sheep Station flock through the Bureau of Land Management and USDA Forest Service include potential bighorn sheep habitat, a unique feature of the Sheep Station location. In addition, the availability of over 3,300 mature ewes and their lambs allows for statistically valid research. No other research unit in the U.S.A. provides this unique environment and the numbers of animals to conduct risk assessments in the context of the domestic and bighorn sheep interface.

Rocky Mountain Bighorn Sheep Direct/Indirect Effects

Alternatives 1, 3, and 4

Effects from activities in these three alternatives are the same since each proposes similar livestock grazing and associated activities near occupied bighorn sheep habitat. Bighorn sheep are not directly affected by grazing on any of the ARS properties, because bighorn sheep do not occur there. The Hilgard bighorn herd in Montana (Lionhead Herd in Idaho) is over 17 miles away from the nearest ARS property (Summer East pasture), and the Tendoy bighorn herd also in Montana is over 23 miles away from the Humphrey property. Interaction between domestic sheep on ARS properties and existing bighorn sheep herds is not known or expected to occur.

Sheep Station sheep grazing on BLM (Bernice allotment) and National Forest System (Snakey/Kelly allotments) has the potential to negatively affect the Idaho bighorn herds reintroduced into the Lemhi range and the Beaverhead range. However, the measures in place are appropriate methods to minimize the potential of contacts, limit the probability of transmission and disease, and are consistent with Idaho direction. The Idaho Progress Report (2009) and the Idaho Bighorn Sheep Management Plan (2010) indicate that bighorn sheep range does overlap with these allotments, therefore the potential for interaction and resulting mortality in the bighorn herds is plausible. Based on a review of parameters modeled in Clifford et al. (2009), bighorn sheep herds that occupy the southern portion of the Lemhi range and to a lesser extent the Beaverhead range have a moderate probability of coming into contact with domestic sheep over a period of a decade, transmitting bacteria, and potentially leading to a respiratory outbreak and subsequent bighorn mortality. This contact could occur from Sheep Station grazing on these BLM/ National Forest System allotments or from contact with private domestic sheep grazing in other nearby areas. Precise research on the movements of this bighorn sheep herd (such as radio-telemetry data collected over a period of years) is expensive and has not yet been completed. However, observation data is being collected in the Southern Lemhi population management unit. Idaho progress reports, the BLM MOU and communications between various agency personnel express a desire and willingness to collect additional site specific data if funds become available.

Snakey - Kelly National Forest System Allotment

Several factors are in place to minimize potential of direct contact and subsequent bighorn herd mortality. Bighorn sheep are thought to be geographically and temporally separated from areas grazed by Sheep Station domestic sheep on the Snakey/Kelly allotments, by an approximate distance of three miles or more of rough terrain and heavy snow loads during winter months (Keetch 2008, Personal communication). Bighorn sheep are known to occupy the west side of the Beaverhead Mountains in the winter months, while the Sheep Station grazes domestic sheep on the east side of Beaverheads (Snakey/Kelly allotments) November 6 - January 3rd.

BLM Bernice Allotment

On the Lemhi range, bighorn sheep typically occupy higher elevations in the foothills and mountains while domestic sheep remain in the lower elevations. Although it is unknown how far south individual sheep may wander in high snow years, bighorn sheep typically stay north of North creek. The Bernice allotment (which is grazed by Sheep Station between November 23 - February 5) is south of the North Creek geographic boundary. In addition to the relative geographic and temporal separation described above, implementation of the "Specified Actions" included in the Bighorn Sheep Action Plan portion of the BLM/Sheep Station MOU further reduces the possibility of potential contact, transmission, and resulting disease in the larger herd in the following ways:

- On site supervision of the domestic sheep bands as well accompaniment by guard dogs would assist in preventing direct contact and interaction between domestic sheep and bighorn.
- Active herding to keep domestic sheep below the 5,600 foot contour and off of mountain foothills and canyons would assist in maintaining geographic separation between bighorns and domestics.
- Scouting for bighorns and maintaining a 3-mile or larger buffer of separation between known bighorn sheep herds and domestic sheep bands would minimize the probability of direct contact.
- Promptly notifying designated Idaho Fish and Game and BLM personnel if contact is suspected or becomes imminent would allow for management removal of individual bighorn sheep to prevent infection spreading to the remainder of the bighorn herd.

Bighorn sheep mortality and overall suppressed health of the Southern Lemhi bighorn herd and/or the southern Beaverhead bighorn sheep herd may or may not occur as result of contact with domestic sheep, but the degree of negative effects to the herd, and the primary source of infection are speculative. Contact could occur from Sheep Station winter grazing on Bureau of Land Management / National Forest System allotments, or from contact with other domestic sheep grazing activities in this portion of the range (such as private lands or other permitted grazing on federal lands) during any season of the year. Grazing practices that are already in place by the Sheep Station, implementation of the specified actions of the Bighorn Sheep Action Plan, and geographic factors that naturally separate Sheep Station grazing and bighorn sheep winter ranges minimize the potential of interaction between Sheep Station domestic sheep and bighorn sheep, and allow for appropriate control/removal of sheep should contact occur or become imminent.

The largest potential concern that could lead to contact, transmission and disease spread would occur after the sheep leave the BLM Bernice allotment or the National Forest System Snakey/Kelly allotment, if stray domestic sheep remain on the allotment, then come into contact with bighorn sheep during the winter or spring months, and that the contact is not immediately detected. In this scenario, it is more plausible that bighorn sheep become infected by *pastuerella* spp. bacteria and carry the disease back to the larger bighorn sheep herd.

Alternatives 2 and 5 Direct and Indirect Effects

Ending Sheep Station sheep grazing on Bernice and Snakey/Kelly allotment would occur in both alternatives 2 and 5. Alternative 2 eliminates all domestic sheep grazing by the Sheep Station while alternative 5 eliminates grazing in the BLM Bernice and National Forest System Snakey/Kelly allotments.

Grazing activities on ARS properties are not known or expected to affect the existing Tendoy and Hilgard/Lionhead bighorn sheep herds, so the alternatives would not change the condition of these bighorn sheep herds.

Ending Sheep Station sheep grazing on Bernice and Snakey/Kelly allotments would eliminate one potential source of infection to bighorn sheep in the Southern Lemhi and Beaverhead mountains. However, removal of this potential vector for disease spread would have unknown potential to eliminate or even largely reduce respiratory disease in the existing bighorn herds for the following reasons:

- Grazing on these allotments occurs outside of the suspected core winter range areas for these bighorn, and the bighorn summer ranges include a much larger landscape that intersects other potential sources of disease transmission.

- The small size and condition of the reintroduced bighorn sheep herds in this portion of Idaho may have many plausible explanations and is as likely to be a result of factors not associated with Sheep Station activities. They include respiratory diseases naturally circulating within the bighorn sheep population, limiting habitat conditions such as nutritional value of forage, fragmented seasonal migration routes, limited winter range capability, and other livestock operations.

- Ending Sheep Station grazing on the Bernice and Snakey/Kelly allotments would reduce one potential vector of respiratory disease transmission. It is speculative that these alternatives would result in an observable change in the existing bighorn sheep herds' condition, health, or population. Just as likely, bighorn sheep herds would remain unaffected by these alternatives, and continue in their current condition.

Rocky Mountain Bighorn Sheep Cumulative Effects

The spatial boundary for the discussion of cumulative effects for bighorn sheep is the upper Snake River Region in Idaho as well as the Montana portion of the Centennial Mountain Range, because this area encompasses all Sheep Station grazing activities that occur in occupied and potential bighorn sheep habitat, and considers state management objectives for known bighorn herds in the area. The temporal boundary is 10 years because projections beyond this time period are less likely to be accurate.

The expected level of the effects for the project would not to contribute to overall cumulative effects in a way which is detrimental to bighorn sheep management in this portion of Idaho and Montana considering the following points:

- Grazing Sheep Station sheep on Forest Service and BLM lands has only a minimal risk of contact between bighorn sheep and domestic sheep because of geographic and temporal separation.

- Grazing Sheep Station sheep near occupied bighorn sheep habitat includes the presence of guard dogs and full-time sheep herders, which affords additional protection measures to reduce the possibility of actual contact between bighorn and domestic sheep.

- The Sheep Station follows the specified actions listed in the Bighorn Sheep Action Plan which includes procedures to manage separation between bighorn sheep and domestic sheep, and initiate a communication plan for prompt removal of infected bighorn or domestic sheep should contact be suspected.

- Although the risk of contact from Sheep Station activities can only be completely eliminated in alternative 2, additional sources for spread of respiratory disease occur throughout known or suspected bighorn sheep range. Thus, bighorn populations are expected to continue in their current condition and trend, regardless of which alternative is selected.

- There are no known or foreseeable planned bighorn sheep reintroductions in areas grazed by the Sheep Station. The proposed action and its alternatives do not preclude bighorn sheep reintroductions; however domestic sheep grazing is one variable that influences sites chosen for reintroduction.

Sage Grouse (*Centrocercus urophasianus*)

The effects to sage-grouse in alternatives 1, 4, and 5 are similar. Benefits to habitat would be derived from grazing activities that increase a mosaic of shrubs, forbs, grasses, and maintain lek sites. There would be less desirable effects from temporary displacement of grouse by grazing bands of sheep or seasonal dietary overlap between grouse and sheep. Given the conservation measures in place, the overall balance between effects would be neutral.

Alternative 3 differs from alternative 1, 4, and 5, because it would leave a large number of sheep for a longer duration at Headquarters, the area of greatest importance to sage-grouse. The effects of that alternative would be a longer temporal disturbance and displacement of sage-grouse, as well as higher utilization of forbs which are preferred by sage-grouse at all life history stages when they are available. Each of the action alternatives is similar in that they use treatments of prescribed fire (approximately 400 acres/yr implemented), which would be a long-term benefit to sage-grouse and their habitats if burn units are kept small and the juxtaposition of those fires does not create large expanses of open habitat. Historic fire activity of a similar duration and intensity has resulted in a currently healthy and stable sage-grouse population and breeding habitat on ARS headquarters property. Therefore, continuing these activities would likely maintain a substantial amount of quality habitat and continue to support a stable sage grouse population.

Alternative 2 eliminates direct disturbance and displacement of grouse, but it would also eliminate the possible benefit of seasonal grazing by sheep and use of prescribed fire to maintain the open nature of leks and manipulate and improve sage-grouse habitat.

In all alternatives, sage-grouse population trends in the project areas would continue to mimic statewide trends (based on annual weather variation), or improve on those trends through maintenance of quality habitat and strong productivity. Sheep Station activities would maintain conditions that contribute positively towards both the Idaho Conservation Plan and the Upper Snake Local Working Group Conservation Plan and would not move the species toward federal listing.

Sage Grouse Affected Environment

Sage-grouse are common on low elevation lands of the Sheep Station, particularly the Headquarters. Annual lek route surveys indicate that sage-grouse habitat on the Headquarters continues to attract numerous sage-grouse for breeding and nesting. The area falls within the Upper Snake Sage-grouse Planning Area identified by the Idaho Department of Fish and Game. This analysis synthesizes information pertinent to the local area including a review of the *Conservation Plan for the Greater Sage-grouse in Idaho* (2006), *Plan for Increasing Sage Grouse Populations Developed by the Upper Snake Sage Grouse Local Working Group* (2004), the *Greater Sage-grouse Habitat and Population Trends in Southern Idaho Progress Report* (2008), and sage-grouse lek survey data collected on ARS properties. Field visits were conducted in 2008 and 2009 to gather additional information regarding vegetation conditions (summarized in the range resource report), fire disturbance history, and to review habitat conditions and issues with area biologists.

The greater sage-grouse is considered imperiled by the Idaho Conservation Data Center, range-wide imperiled by the Bureau of Land Management and sensitive in Region 4 of the USDA Forest Service (Idaho Comprehensive Wildlife Conservation Strategy February 2006). In March of 2010, the USDI Fish and Wildlife Service concluded that the greater sage-grouse warrants protection under the Endangered Species Act, however that is precluded by the need to take action on other species facing more immediate threats (USDI Fish and Wildlife Service 2010). Thus, sage-grouse has no federally listed status, but is a candidate for listing. A review of greater sage-grouse life history can be found in the 2004 *Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats* (Connelly et al. 2004). A condensed version of life history specific to Idaho from the Idaho Fish and Game Comprehensive Wildlife Conservation Strategy (2006) is summarized below.

The greater sage-grouse occurs in 11 states and two Canadian provinces including: Alberta, California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, Saskatchewan, South Dakota, Utah, Washington, and Wyoming. This bird is widely distributed throughout sagebrush dominated habitats of southern Idaho (Schroeder et al. 1999).

Recent analysis of breeding population data indicates that 11 of 13 (85 percent) states and provinces showed significant long-term declines in size of active leks. Greater sage-grouse populations declined at an overall rate of 2.0 percent per year from 1965-2003. From 1965-1985, the sage-grouse population declined at an average of 3.5 percent per year. However, from 1986-2003 the population declined at a much lower overall rate of 0.4 percent. In Idaho, sage-grouse populations declined at an overall rate of 1.5 percent per year from 1965-2003. From 1965-1984, the population declined an average of 3.0 percent per year but from 1985-2003 the population had an annual change of only 0.1 percent per year (Connelly et al. 2004).

Greater sage-grouse are totally dependent on sagebrush-dominated habitats. Breeding habitat (areas used for breeding, nesting, and early brood rearing) is characterized by sagebrush canopy coverage of 15-25 percent with a healthy grass and forb understory (Connelly et al. 2000). During summer, sage-grouse may use a variety of habitats but are generally found in areas with succulent forbs and insects. Winter habitat consists of relatively large areas of taller sagebrush with 10-25 percent canopy cover. During the winter sage-grouse consume 99 percent sagebrush in their diet. In early spring the diet consists largely of sagebrush and some forbs. During later spring and summer, the bird's diet includes insects and forbs. Clutch size varies from 6-9 eggs and incubation time ranges from 25-29 days. Chicks are precocial and grow rapidly. Breeding is common for yearling hens and yearlings often have smaller clutches than adults (Schroeder et al. 1999). Sage-grouse are typically long-lived (4-5 years is not uncommon) with low reproductive rates compared to other game birds. Survival differs among age and gender groups and adult females tend to have higher survival rates than males or juvenile females.

In general, the loss, degradation, and fragmentation of sagebrush habitat are the major threats to the greater sage-grouse in Idaho (Connelly et al. 2004). Factors contributing to habitat degradation include alteration of historical fire regimes, conversion of land to farming or intensive livestock forage production, water developments, use of herbicides and pesticides, establishment of invasive species, urbanization, energy development, mineral extraction, and recreation (Connelly et al. 2004).

Sage-grouse have used the habitat in, on, and around the sheep station prior to settlement of the area. Sage-grouse research on the Sheep Station shows that they use the Headquarters area for breeding, nesting, and early brood-rearing activities. In late summer many of the grouse move further north towards Henninger and the foothills of the Centennial mountain range. They spend the late summer and early fall there before returning to the Sheep Station on a gradual migration to the south and lower elevations (such as areas around Bernice allotment and the Idaho National Laboratory (DOE)). Some sage-grouse stay on the Headquarters property year-round, but most use it seasonally. It plays an important role in population growth and stability as it provides key habitat for pre-nesting, breeding, nesting, and early brood-rearing.

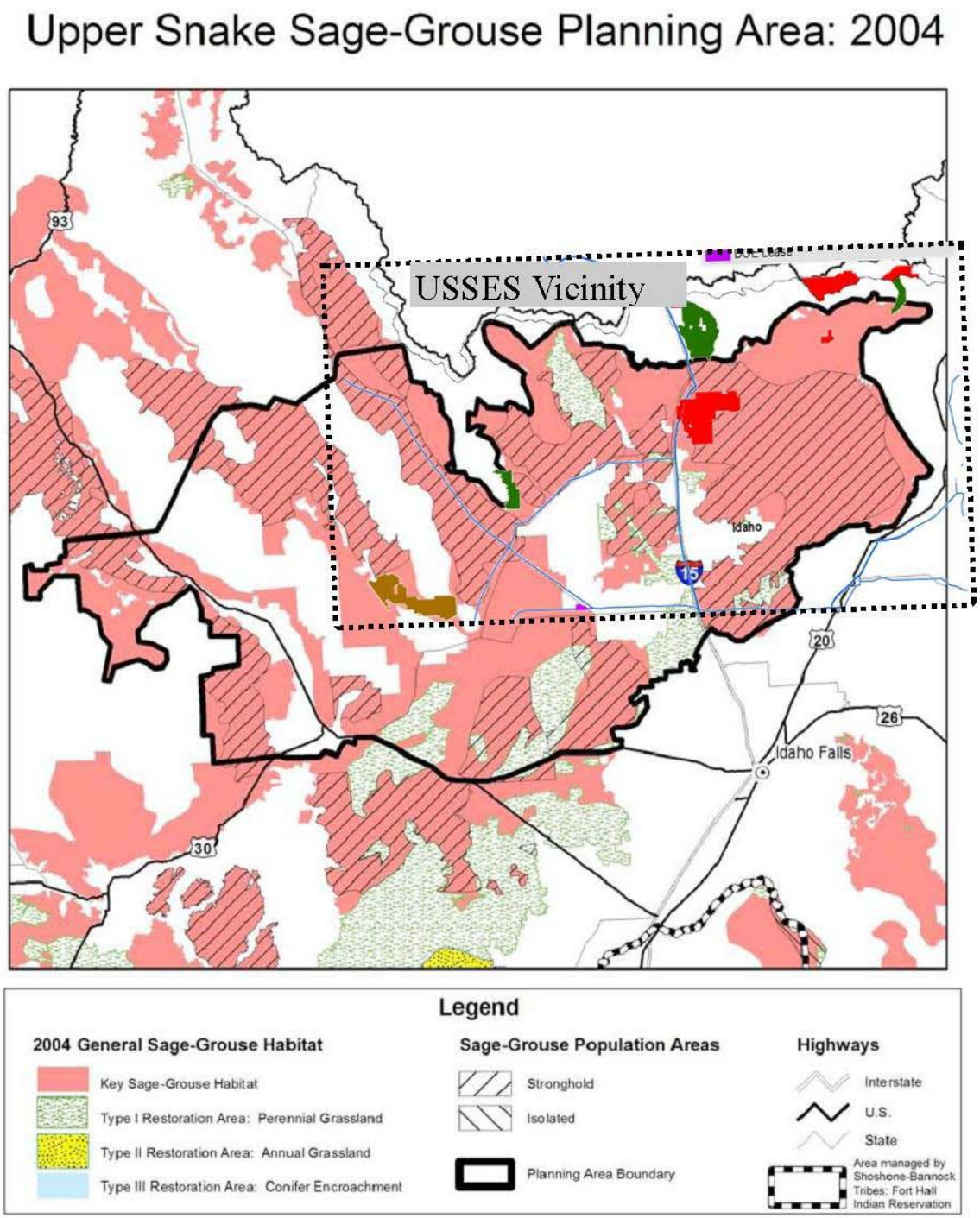

Figure 44. Upper Snake sage-grouse planning area

Lek surveys have been collected on Sheep Station Headquarters regularly since 1978 through 2009. Through a variety of observers and varying count methodologies, a trend of improvement is indicated. An informal review of past count information on the Sheep Station (Sheep Station personnel 2008, personal communications) shows that in 1966, 12 active leks were identified on the entire headquarter section of the Sheep Station. In the period of 2003 through 2009, the number of active leks on established routes varied between 12 and 14. The Sheep Station has identified an approximate total of 20 active leks on the

Headquarters property, but not all are included in the annual Upper Snake annual monitoring protocol. Overall the sheep station has seen fluctuations in the number of leks and the number of males strutting on each lek.

Nevertheless, numbers have increased since 1978. In 1978 there were 167 males on 10 active leks; in 2009 there were 351 males on 12 active leks. Hulet et al. (1986) studied movements and habitat selection of greater sage-grouse at the Sheep Station and found that some birds made very long seasonal migratory movements between the Sheep Station and winter range located towards the Department of Energy Idaho National Laboratory property to the south.

According to figures in the *Idaho Sage-grouse Local Working Group's Statewide Annual Report*, (2008), sage-grouse productivity in the upper snake has typically been similar to or higher than the statewide average. Based on analysis of prior lek data, IDFG increased the season and bag limits for sage-grouse in the Upper Snake planning area partly because lek counts exceeded 150 percent of the 1996-2000 average. Evidence of this high productivity is shown by the substantial number of sage-grouse harvested in the Upper Snake Planning Area varying between 1,700 birds (2004) and 4,698 birds (2008). These figures represent some of the highest numbers in Idaho.

The *Conservation Plan for Greater Sage-grouse in Idaho* (2006) attributes habitat threats in the Upper Snake planning area primarily to a conversion to croplands and influences from roads and power lines, while wildfire has played only a minor role in habitat loss.

There are a number of conservation measures employed by the Sheep Station to minimize effects of sheep grazing and proposed activities. They include the following:

- Most leks have been identified on the ground and are annually inventoried. As a result, the Sheep Station closely monitors sage-grouse breeding populations and submits data to Idaho Game and Fish personnel.
- The Sheep Station employs a grazing strategy that avoids using active lek sites during the courtship season. During the period when leks are active, temporary troughs for watering sheep are specifically placed in locations and pastures without leks, in order to avoid disturbance. Also, full time sheep herders manage the daily movements of sheep and, thus, are able to assist in keeping sheep away from active leks.
- After courtship season, the temporary water troughs are specifically placed in sites that previously had active leks. Concentrated sheep activity keeps shrub encroachment to a minimum, ensuring that leks persist annually and do not become overgrown with big sagebrush.
- Sheep are moved rapidly through pastures which results in minimal disturbance to sage-grouse that might be in the area, and utilization on forbs and grasses remains light. Pasture sizes on the Headquarters vary between approximately 640 acres to 1100 acres, and sheep are moved through a pasture in six or seven days.

Fire History in Sage-grouse Habitat

Both wildfire and prescribed fire to improve range land has occurred on ARS property with records dating back to 1936. Burn records show that approximately 19,000 acres have burned in the past 30 years and approximately 4,000 acres have burned in the last 10 years. These figures represent total acreages burned, areas that have burned more than once, and a mosaic of burned and unburned patches within burn polygons. Prescribed fire has occurred in previous years at a rate of approximately 670 acres annually. Appendix A contains maps of past wildfire, past prescribed fire, and the larger landscape where future

burns would be considered. These historic rates of natural and prescribed fire are greater than guidelines in Connelly et al. (2000) which suggest no more than 20 percent of breeding habitat should be modified in a 20-year breeding period. Despite this history of fire disturbance, ARS properties continue to support a healthy and stable sage-grouse breeding population and associated leks. The continuing health of the sage grouse population and habitat on ARS properties is thought to be attributed to the patchy mosaic and small size of past fires, quick regeneration of sagebrush based on locally mesic conditions, and large expanses of dense sagebrush cover that remains across the headquarters property.

To conduct research on forage production, research on delayed grazing strategies, and to achieve secondary benefits to sage-grouse and other wildlife species, the Sheep Station proposes burning Headquarters pasture areas. An 11,803 acre landscape area has been identified for future burn opportunities, with an average of 400 acres per year, and a total of 2000 acres in the next five years (2016). Individual burn plans would be prepared to include specific location and design of burn units in order to meet research objectives. It is expected that many burn units would not reach complete combustion, leaving unburned areas within a burn unit perimeter.

Sage-grouse Direct and Indirect Effects

Alternative 1 - Proposed Action

This alternative would continue grazing practices as currently constituted. From mid January to mid April there would be no effect to sage-grouse, because all sheep would be on the Headquarters feedlots. From mid April through mid June, 3,300+ sheep would be grazing the Headquarters pastures. Although this could affect sage-grouse breeding, nesting, and early brood-rearing activity, conservation measures are in place that would minimize impacts and interactions of sheep with sage-grouse by avoiding leks, known nesting areas, and known early brood-rearing areas. Therefore, the effects to sage-grouse during this period would be minimal and would not greatly reduce productivity. From late June to early July (2 weeks) about 2,000 sheep would be moved north to graze on the Henninger ranch property. Local data shows that some sage-grouse move toward this area as early as late June. There would be some displacement of sage-grouse on this 1,100 acre property during this two week period, but effects to the population as a whole would be minimal due to the small proportion that the Henninger ranch comprises of the total available habitat. The remaining 1,300 sheep not on Henninger would be split between two areas: Humphrey ranch and East Beaver (which contains very little productive sage-grouse habitat). There would be minimal negative effects of displacement of grouse in the Humphrey ranch area and overall effects to productivity, movements, or migrations would be minor.

From September to November all of the 3300 sheep return to the Headquarters pastures. This coincides with the movement and flocking of the grouse to the Headquarters range in their normal movements to lower elevations preparatory to winter. Some displacement would occur as grouse avoid sheep herds. However, during the autumn season sage-grouse diets are rapidly changing to almost 100 percent utilization of sagebrush, so any dietary overlap with sheep would be minimal. Very few sage-grouse utilize the winter habitat near where sheep would be grazing on Snakey, Kelly, or Bernice, because it is suboptimal with salt desert shrub habitat being more dominant, and therefore the effects would be negligible.

Prescribed fire would initially create a temporary loss of nesting, brood-rearing, fall, and winter habitat for sage-grouse in approximately 100 to 200-acre patches (within the 400 acres burned per year). This small loss of habitat would temporarily displace grouse for a 5-10 year period until shrubs begin to reestablish and the areas return to use by brood-rearing grouse. It would take a total of 20-40 years for each burned area to return to a later mid-seral or pre-burn state. This may cause grouse to shift use of

traditional areas until the area has recovered or provides optimal herbaceous requirements during each specific season of use. Given that the proposed acreage is minimal, these small scale fires would not have a major effect on sage-grouse. Benefits to habitat overall would be derived from grazing activities that increase a mosaic of shrubs, forbs, grasses; and maintain lek sites. There would be less desirable effects from temporary displacement of grouse and seasonal dietary overlap of grouse and sheep. Given the conservation measures in place, the overall balance between positive and negative effects to grouse are neutral. Sage-grouse populations and habitat on the Sheep Station would be maintained in a healthy condition.

Alternative 2

Alternative 2 represents the no grazing alternative because of a proposed 65 percent reduction in the total number of sheep grazed in alternative 1. In addition, these sheep are maintained in feed lots, and grazing would be discontinued on all other properties. The direct and indirect effects to sage-grouse could be both beneficial and detrimental in nature. A study performed on the Sheep Station (Bork et al. 1998) showed that areas of fall sheep grazing exhibited significantly greater live forb and herb cover than at control plots, and areas of spring sheep grazing exhibited significantly greater live shrub cover than control plots. Each of these components of sage-grouse habitat would be largely reduced, and the mosaic across the landscape would decrease. Displacement of sage-grouse from habitat and associated behavioral disturbances would be reduced, however these potential benefits would likely be offset by the loss of a mosaic among forb, grass, and shrub cover no longer created through Sheep Station activities.

Alternative 3

The effects of alternative 3 differ from those of the proposed action. The differences are in the details of the temporal grazing in Henninger and at Headquarters and the 20 percent reduction of total numbers of sheep from alternative 1. Instead of high-intensity short-duration grazing on Henninger, this alternative would result in low-intensity long-duration grazing. It would allow 340 sheep to graze from early June to sometime in mid September when they would bring about 200 head back to Headquarters. The effects of longer duration grazing, even with fewer sheep, could cause long-term avoidance of that area by sage grouse during the season of sheep use. The direct effects of displacement on Henninger would be more pronounced than a two-week high intensity use of the area. The indirect effects of having low-intensity and long-duration grazing would be decreased forb availability and abundance for sage-grouse. Sheep would have a longer duration to select for and thereby reduce succulent forbs important to post-nesting hens and new chicks. This alternative would place a large number of sheep (2,300-2,640) on the Headquarters pastures for a longer period of time causing additional detrimental effects to sage-grouse productivity during the nesting and brood-rearing seasons. It would be more difficult to implement avoidance conservation measures prescribed in those areas because of the increased duration of grazing in occupied habitat. The direct impacts could include disruption of nesting and brood-rearing activities, as well as seasonal (rather than short term temporary) displacement to suboptimal habitats. In addition, indirect impacts of long-term grazing plus prescribed fire would result in decreased forb abundance and diversity.

Alternative 4

The effects of alternative 4 are the same as those of the proposed action (alternative 1) until early July through September. During that time, to minimize potential conflicts with grizzly bears, 2000 sheep would not graze the Summer Pasture (Toms) creek or Meyers Creek (National Forest System land), but would instead be placed in the West Pasture (Odell and Big Creek) on the Centennial range. Due to the fact that very few sage-grouse use the area and the habitat found throughout the Centennial range is interspersed with conifers, the direct and indirect effects to sage-grouse of this alternative are negligible.

Alternative 5

The effects of alternative 5 are similar to the proposed action. However due to the 30 percent reduction in total sheep numbers (from 3,330 to 2330), less disturbance would occur during the breeding and brood-rearing season. The conservation measures in place would largely neutralize these effects. In addition the sheep would not be grazed southwest of Headquarters at Snakey, Kelly, or Bernice allotments, but would instead be put in the feed lot from October into April. This change in winter grazing would have negligible effects on sage-grouse or their habitat.

Sage-grouse Cumulative Effects

The spatial boundary for the discussion of cumulative effects for sage-grouse is the Upper Snake Sage Grouse Planning Area because it is the population boundary as managed by the Idaho Department of Fish and Game. The temporal boundary is 10 years, because projections beyond this time period are similar to those being described but with decreased precision. The expected level of effects from this project would not combine with overall cumulative effects in a way that is detrimental maintaining healthy sage-grouse populations and habitat in the Upper Snake Planning Area, considering the following points:

- Idaho Fish and Game assessed overall lek productivity in the Upper Snake Planning Area and found that counts were greater than 150 percent of the average 1996-2000 counts. Because of this increased productivity, daily hunting bag limits were increased and the length of the hunting season was expanded (Idaho sage-grouse Local Working Group Statewide Annual Report 2008).

- The 2008 sage-grouse harvest in the Upper Snake planning area represents nearly double the average number of birds harvested annually the four years prior (Idaho sage-grouse Local Working Group Statewide Annual Report 2008). This increase demonstrates the IDFG position that sage-grouse habitat and productivity in the Upper Snake planning area is stable.

- There has been an upward trend of males counted on leks during the past five years, indicating that habitat has not been limiting survival and productivity.

- The Mountain States Transmission Intertie is a regional project which would bisect sage-grouse habitat on the Headquarters property as well as other habitat in cumulative effects area. Increased effects to sage-grouse from this transmission line (if permitted) would include higher rates of predation along the corridor and corresponding avoidance of adjacent habitat. Although the precise effects of the transmission line would be analyzed separately, it is not expected that the disturbance would limit sage-grouse ability to inhabit the Sheep Station or the Upper Snake planning area because of large expanses of available habitat nearby.

Pygmy Rabbit (*Brachylagus idahoensis*)

Pygmy rabbit was found to be "not warranted for listing" by the USDI Fish and Wildlife Service in September, 2010 (USDI Fish and Wildlife Service 2010).

The effects to pygmy rabbits under alternatives 1, 4, and 5 are similar. Temporary displacement of pygmy rabbits would occur in these alternatives. Pygmy rabbits would persist with population numbers and trends similar to the current condition, considering that they still exist in the same areas they were found in the 1950s, despite the last 50 years of grazing and land management in the area. From mid-March through mid-May, conservation measures taken to avoid sheep/grouse interactions on leks could create increased disturbance to rabbits. As areas close to leks are avoided, thicker more dense patches of sagebrush habitat may be used. This could directly impact feeding and/or breeding activities of rabbits. Only minimal dietary overlap between sheep and rabbits would occur, so the effects would be negligible.

Because pygmy rabbits live in older, taller, denser stands of sagebrush and mixed shrubs, prescribed or wildland fires can eliminate, fragment, or degrade portions of pygmy rabbit habitat until shrub cover returns to a mature state. A study in Utah at similar elevations showed that pygmy rabbits would only venture 50 meters from the edge of mechanical treatments. Prescribed fire research in occupied pygmy rabbit habitat should consider design features that include narrow burn strips or an unburned sagebrush matrix to allow for continued occupancy by pygmy rabbit. Alternative 3 grazes a larger number of sheep at Headquarters for a longer duration. The effects of that alternative would be a longer temporal disturbance with additional displacement of pygmy rabbits. Alternative 2 would eliminate any interaction with or displacement of rabbits because all of the sheep would be on feedlots.

Pygmy Rabbit Affected Environment

The pygmy rabbit is considered imperiled by the Idaho Conservation Data Center, range-wide imperiled by the Bureau of Land Management, and sensitive in Region 4 of the USDA Forest Service; but was found not warranted for federal listing by the USDI Fish and Wildlife Service. A condensed version of life history specific to Idaho from the Idaho Fish and Game Comprehensive Wildlife Conservation Strategy (2006) is summarized below.

The pygmy rabbit is a sagebrush obligate inhabiting areas characterized by cold winters, warm summers, and scant precipitation. Elevations range from 900-2380 m (2800-7800 ft). Habitat comprises dense, tall stands of big sagebrush growing on deep, friable soils that allow the rabbits to dig rather extensive burrow systems (Janson 2002). Landscape features includes alluvial fans and hillsides, swales within rolling topography, floodplains, brushy draws, riparian channels, edges of rock and lava outcroppings, and mima mounds (low, circular mounds of loose, unstratified soils that support distinctly taller patches of sagebrush). Sagebrush is the primary food item of pygmy rabbits and may comprise up to 99 percent of the winter diet (Green and Flinders 1980). Native forbs and grasses comprise a larger proportion of the diet (30-40 percent) in spring and summer. Under deep snow conditions, dense and structurally diverse stands of big sagebrush facilitate subnivean burrowing, providing access to forage and protection from predators and thermal extremes (Katzner and Parker 1997).

This species occurs in the Great Basin and adjoining intermountain regions. Populations are widely scattered across this landscape in association with tall, dense sagebrush aggregations with deep, loose soils of alluvial origin that allow burrowing. In Idaho, pygmy rabbits occur across the southern half of the state. The species is considered rare in Idaho, though data on abundance and population trends are generally lacking. Recent surveys for presence of pygmy rabbits have augmented statewide distribution data and documented relatively abundant populations in localized areas.

Loss, alteration, and fragmentation of sagebrush-steppe habitat and apparent declines in pygmy rabbit populations have elevated concern for this species (Knick and Rotenberry 1995). Since settlement by Europeans, sagebrush-steppe landscapes in Idaho and across the sagebrush biome have been greatly altered, resulting in loss and fragmentation of habitat for many sagebrush obligate species, including the pygmy rabbit. Agents of habitat loss and degradation include agricultural conversion, urbanization (and related infrastructure networks), prescribed and wildland fire, invasive plants (e.g. cheatgrass), conifer encroachment, vegetation treatments that remove sagebrush, and unsustainable livestock grazing (Connelly et al. 2004). Fragmentation of pygmy rabbit habitat has implications for this small mammal with limited dispersal capabilities, including reducing overall population size, isolating disjunct populations, increasing susceptibility to disease and other localized threats, and reducing gene flow among populations (Gilpin 1991).

Although extensive data on population numbers and the current distribution are somewhat lacking, research in the late 1970s showed that pygmy rabbits occurred on portions of ARS properties and they

were abundant in those locations. Limited data obtained from the Idaho Department of Fish and Game showed four different point locations for pygmy rabbits on ARS properties and many locations on lands adjacent to the ARS properties. Suitable habitat exists not only on ARS properties, but on adjacent BLM, National Forest System, (DOE Idaho National Laboratory) and private lands. The range assessment on ARS properties (July 2009) showed that two of the seven sites measured on ARS properties have similar shrub cover components to those measured on ARS properties in the late 1970s where pygmy rabbits occurred.

Pygmy Rabbit Direct and Indirect Effects

Alternative 1 - Proposed Action

This alternative would continue grazing practices as currently constituted. From mid January to mid April there would be no effect to pygmy rabbits, because all sheep would be on the Headquarters feedlot. Temporary displacement of rabbits would begin as sheep are released to graze in the Headquarters pastures in mid-April. This disturbance may be exacerbated when sheep are moved to avoid interactions with grouse on leks. This may move sheep into areas of thicker more dense patches of sagebrush habitat, which, if occupied, are key to pygmy rabbit survival. This could also have small direct impacts on feeding and/or breeding activities of rabbits. There is very little dietary overlap between sheep and pygmy rabbits, so effects of grazing to the vegetation needed by pygmy rabbits would be negligible.

From June through mid-September sheep would be grazing on the Henninger, Humphrey, and East Beaver pastures to the north. Pygmy rabbits are not expected to occur in these areas because of the habitat changes associated with higher elevations and soil types. No effect to pygmy rabbits is expected from activities in these pastures. During mid-September through mid-October, while all 3,300 sheep are back on the Headquarters pastures there would be some displacement of pygmy rabbits or disruption of normal behaviors, but the effects would be minor. Late fall/winter grazing to the south would minimally affect pygmy rabbits. Dietary preference of pygmy rabbits switches from a mixture of shrubs, grasses and forbs, to about 99 percent sagebrush during the winter months. Grazing sheep on the Bernice, Kelly, and Snakey pastures to the south could temporarily disturb rabbits in that area. Effects would be minimal due to the fact that two thirds of the total number of sheep grazed would be spread out over multiple pastures for about a month and a half each. More rabbits would be affected by winter grazing, but the disturbance would last for a shorter period of time, over a larger area.

The proposed prescribed burning (400 acres per year in approximately 100 or 200 acre patches) would have the potential to eliminate, fragment, and/or degrade habitat to a varying extent dependent upon the burn design and location. Pygmy rabbits select areas of dense mature sagebrush and ideally at a very late seral stage. The highest quality habitat may take 50 or more years to return to pre-burn conditions. Thus, late-seral sagebrush habitat could become a limiting factor if the combined effects of this action and other wildfire disturbances do not retain adequate cover. Since pygmy rabbit home ranges are small, and they don't venture far from a habitat edge into open habitat, the location, small size and juxtaposition of prescribed burns would be important in minimizing long-term degradation of pygmy rabbit habitat.

Alternative 2

The direct and indirect effects to pygmy rabbits could be both beneficial and detrimental in nature. A study performed on the Sheep Station (Bork et al. 1998) showed that areas grazed in the spring by sheep exhibited significantly greater live shrub cover than in control plots. The same study showed that areas grazed in the fall by sheep exhibited significantly greater live forb and herb cover than at control plots. This shows that in the absence of spring grazing and other activities, shrub cover would decrease in some areas resulting in small reductions in pygmy rabbit habitat. Although displacement and behavioral

disturbances to pygmy rabbit would be reduced, potential benefits would be offset by the change in forb, grass, and shrub cover no longer created through Sheep Station activities.

Alternative 3

The differences of alternative 3 compared to the proposed action are in the details of the temporal grazing in Henninger and at Headquarters and the 20 percent reduction of total numbers of sheep. This alternative would place a larger number of sheep (2,300-2,640) on the Headquarters pastures for a longer period of time causing additional potential for displacement and disruption of pygmy rabbit daily activities. Increased utilization by sheep would result in further reductions in shrub cover important to pygmy rabbits. On Henninger, the change is unlikely to affect pygmy rabbits because they are not known or expected to occur in that pasture.

Alternative 4

The effects of alternative 4 are the same as those of the proposed action. To minimize potential conflicts with grizzly bears, 2,000 sheep would not graze the Summer Pasture (Toms Creek) or Meyers Creek (National Forest System land) July through September. Instead, sheep would be placed in the West Pasture (Odell and Big Creek) on the Centennial range. Pygmy rabbits are not expected to occupy these areas of the Centennial range because habitat is naturally fragmented and interspersed with conifers.

Alternative 5

The effects of alternative 5 are similar to the proposed action. However due to the 30 percent reduction in total sheep numbers (from 3,330 to 2,330), less disturbance would occur during the spring and early summer. In addition, sheep would not be grazed southwest in Snakey, Kelly, or Bernice, but would instead be put in the feed lot from October into April. This change in winter grazing would have a small positive effect on pygmy rabbits and their habitat.

Pygmy Rabbit Cumulative Effects

The spatial boundary for the discussion of cumulative effects for pygmy rabbits is the Upper Snake Sage Grouse Planning Area because pygmy rabbit distribution is similar to sage-grouse distribution, and landscape conditions and threats for that area are described in the sage-grouse Conservation Plan. The temporal boundary is 10 years because projections beyond this time period are similar to those being described but with decreased precision. The combined effects from this project and other planned projects in the cumulative area boundary would be unlikely to reduce pygmy rabbit populations or habitat beyond a critical threshold for the following reasons:

- Observational data indicates that pygmy rabbits are persisting in the same areas they were found in the 1950s, despite the last 50 years of grazing and land management.
- Fire in the Upper Snake Planning Area has played only a minor role in loss of sagebrush habitat.
- The Mountain States Transmission Intertie is a regional project which would bisect pygmy rabbit habitat on the Headquarters property. Effects from the power line would be limited to minor losses of sagebrush habitat within the proposed powerline corridor, but would occur on a scale that is not likely to limit pygmy rabbit distribution across the area.

North American Wolverine (*Gulo gulo luscus*)

Wolverines are uncommon and wide ranging, but may use ARS properties in the Centennial Mountain Range for occasional foraging.

Wolverine Affected Environment

A summary of regional wolverine distribution, habitat, ecology, and issues can be found in Idaho Comprehensive Wildlife Conservation Strategy (CWCS), species accounts in appendix F (Idaho Department of Fish and Game 2005). Wolverines use large tracts of land ranging from 150 square miles to over 500 square miles, and talus slopes are important for denning. ARS properties contain good summer wolverine habitat made up of sub-alpine forests and meadows, minimal roads, and minimal human disturbance on Odell Creek, Big Mountain, and Toms Creek allotments. Winter habitat may occur in the foothills including Humphrey Ranch and Henninger Ranch properties, in particular as it relates to ungulate use as a food source for wolverine. The Headquarters property is non-forested and outside of wolverine habitat. ARS properties are small in comparison to overall habitat needs, so occurrences of wolverines are expected to be uncommon. A petition to list wolverine was found not-warranted in March of 2008 by the USDI Fish and Wildlife Service (USDI Fish and Wildlife Service 2008), because in the contiguous United States, a significant portion of its range is not represented, and it is not a distinct population segment. Idaho lists the species as imperiled (S2) and Montana lists the species as vulnerable (S3), noting that human disturbances (such as roads and motorized winter recreation) may create barriers to movement, reduce winter foraging opportunities, and may affect reproductive success. State heritage databases indicate a number of wolverine observations in the Centennial Mountain Range.

Wolverine Direct and Indirect Effects

Wolverines have not been known to depredate domestic sheep on ARS properties. No control actions have occurred, and none are expected to occur for the species. The described activities for all alternatives do not create barriers to wolverine travel, do not alter forest vegetation or ungulate populations that might affect wolverine use, and do not concentrate activity on talus slopes that might be used for denning. Sheep Station activities would have no effect on wolverine or their habitat. Potential habitat connections provided by the Centennial Range between the Greater Yellowstone Ecosystem and Central Idaho would not be altered.

Wolverine Cumulative Effects

Activities would not have effects to wolverine and, thus, would not contribute cumulative effects to wolverine populations or habitat that might be present.

American Black Bear (*Ursus americanus*)

Black Bears are common in ARS properties in the forested portions of the Centennial Range. Statewide, they are managed as game species and legally hunted.

Black Bear Affected Environment

The status of the American black bear in Idaho and Montana is secure (S5). The species is considered a game species and is hunted in the spring and fall in both Montana and Idaho. The species has no federal status. Black bears are common in the foothills and the high elevation areas of the Centennial Mountain Range. Encounters can occur in suitable habitat in Odell, Big Mountain, and Toms Creek allotments, Henninger Ranch, and Humphrey Ranch. Black bears generally do not occupy the Headquarters pasture, though individual bears may occasionally travel along the riparian areas of Beaver Creek, which has thick cover adjacent to the stream. Sheep herders encounter black bears on an annual basis, but most encounters do not lead to lethal control (Farr 2008, personal communication). More often, sheep are moved to a new area, guard dogs discourage further incidents, or black bears discontinue interest in the domestic sheep as a food source. A review of known black bear control actions on ARS properties indicates that past black

bear conflicts with sheep have resulted in 11 black bears being killed in 1988 in the Odell Creek pasture during the period of the Yellowstone fire, and employees killing two black bears related to other incidents. No black bears have been trapped and relocated from ARS properties. If a black bear is suspected of killing sheep, Sheep Station staff contacts Wildlife Services to investigate the matter and implement control actions if necessary. Mitigation measures to deter bears were discussed previously in the grizzly bear section. The use of guard dogs, full time sheep herders, and trash removal are instrumental in minimizing potential depredations, conflicts, and control actions.

Black Bear Direct/Indirect Effects

The direct and indirect effects to black bears are the similar to those described for grizzly bears. However, encounters are more likely to occur annually and lethal control would be implemented on occasion. Estimated figures for past lethal control of black bears on ARS properties indicates that only a small number of black bears (less than 15) have been removed over the last 11 years, and that most conflicts end without lethal control. It is estimated that black bear removals would occur at a similar rate in the alternatives that graze sheep in the Centennial Range (alternatives 1, 4, and 5). Most years, no black bears would be killed. However, in drought years with poor food production, more bears would be taken. These figures amount to an average of one bear being killed per year. In alternatives 2 and 3, control actions for black bear are likely to be unnecessary since sheep would not be grazed in typical suitable habitat. As a result, it is likely that no black bears would be killed from Sheep Station activities under these alternatives. In all alternatives, black bear populations are estimated to remain secure. The proposed action and its alternatives are not expected to limit habitat connectivity as is discussed in more detail in the "Connectivity" section of the wildlife report.

Black Bear Cumulative Effects

None expected. The species is common in the Centennial Mountain Range despite legal hunting pressure and occasional control actions. Spring and fall hunting seasons that occur in Idaho and Montana are most likely to determine local black bear population statistics.

Fish and Amphibians

Fish and Amphibians Affected Environment

Fish habitat on ARS properties is limited to just a few perennial streams and lakes. In Idaho, Beaver Creek intersects Humphrey Ranch for about 1.5 miles and the Headquarters property for approximately 0.75 miles. It has substantial flow during spring run-off, and, in some areas supports stocked rainbow trout, brown trout and brook trout. During summer periods, the stream becomes a dry channel along lower sections near the Headquarters property because of decreased summer water flows and the geology of the area. Thus, it does not support a year-round fishery there.

The *Management Plan for Conservation of Yellowstone Cutthroat Trout in Idaho* (IDFG 2007) indicates that Yellowstone cutthroat trout are found in a few isolated tributaries to Beaver Creek, but none are on or immediately adjacent to ARS properties. Henninger Ranch has two intermittent streams, Dry Creek and Moose Creek, neither of which support a fishery.

The Montana portions of ARS properties include several drainages: Odell Creek allotment contains two branches of Odell Creek and the headwaters of Corral Creek. Big Mountain Allotment contains Spring Creek. The Toms Creek allotment contains Hell Roaring Fork and three headwater branches of Toms Creek. Odell Creek was observed to be fish bearing on ARS properties during 2008 field surveys conducted by the project biologist who observed a population of brook trout in the west branch of Odell

Creek. Montana Heritage database records indicate that Odell Creek and Hell Roaring Fork Creek have westslope cutthroat trout populations.

Four lakes are within the Montana portions of ARS properties including Big Odell Lake, Little Odell Lake, Blair Lake, and Lillian Lake. Montana Fish Wildlife and Parks informed us during scoping that stocked sport fisheries are currently managed in Blair, Lillian, and Odell Lakes within the project area and could be desirable for stocked westslope cutthroat trout.

- During field surveys conducted in 2008 and 2009, the wildlife biologist identified the following amphibians:
- Spotted frogs and confirmed breeding populations in the west fork of Odell Creek, Big Odell Lake, Little Odell Lake, and Blair Lake;
- Boreal western toads on Big Odell Lake; and
- Western chorus frog on the stock watering pond on Humphrey property.

Arctic grayling use spawning habitats in lower reaches of Red Rock, Odell, and Corral Creeks downstream of the ARS properties. This downstream population is one of two confirmed native Arctic grayling populations in the 48 contiguous states.

Interdisciplinary review of current aquatic conditions found that sheep grazing and associated activities are having minimal effects to streams and that healthy aquatic and riparian habitat conditions are being maintained for perennial streams and lakes. Most channel segments were rated as in "Proper Functioning Condition" by the interdisciplinary team, and the concerns in those segments rated otherwise are attributed to historical and other uses such as an old gravel pit (lower Beaver Creek, Headquarters), an old mining road (Spring Creek), and irrigation ditches associated with intermittent streams on Humphrey and Henninger Ranch. Stable stream channels, non-erosive banks, functioning flood plains, dense willows, and the vigor of riparian vegetation are characteristic in all of the fish-bearing streams and lakes and where amphibians are expected to occur (Summer Range). Field observation on Blair Lake, little Odell Lake, Big Odell Lake, Odell Creek and other areas indicate that quality amphibian habitat is abundant, remains occupied with breeding individuals, and effects to habitat are minimal.

Fish and Amphibians Direct, Indirect, and Cumulative Effects

Observed conditions indicate that all of the alternatives would have negligible effects to stream hydrology and associated fish habitat, as well as riparian habitats and associated amphibian populations. There would not be a change in fisheries or amphibian habitat between the proposed action (alternative 1) and those areas of alternatives 2-5 where grazing no longer would occur. In those areas, vegetative conditions and soil compaction immediately at vacated stream crossings and watering areas would rehabilitate naturally. Downstream effects to fisheries and amphibian habitats from Sheep Station activities would remain negligible. No cumulative effects would occur.

Effects to fisheries and amphibians and associated aquatic resources are minimal, and would maintain the current condition in the proposed action (alternative 1), as well as in alternatives 3, 4, and 5. Areas of bare soil would occur at stream crossings. However, these effects are limited to the narrow trail width approaching the streams, which varies between five feet (typical) and 15 feet (atypical). No effects would occur to arctic grayling or westslope cutthroat trout because they occur well downstream of the project, and proposed activities would not degrade downstream habitats. No effects would occur to Yellowstone cutthroat trout because they occur in tributaries outside of and unaffected by ARS properties and activities. No effect would occur to sport fisheries that occur in the larger lakes. Effects to spotted frogs,

boreal western toads, chorus frogs, and other amphibians would be rare and limited to the loss of a few individual animals (adult amphibians or larvae) in localized areas associated with watering activities in springs and lakes. Although the location of effects may differ among alternatives because of varying locations grazed, the overall health of aquatic resources would continue similar to the current condition without threat to fish, amphibians or associated habitat.

Connectivity

Numerous scoping comments were received indicating the importance of the Centennial Mountain Range as a component of contiguous habitat for carnivores, providing linkage between the Greater Yellowstone ecosystem, Central Idaho, and the Northern Continental Divide Ecosystem. The area is relatively free of human disturbances and provides varying amounts of suitable habitat for wide-ranging carnivores including grizzly bears, wolves, black bears, wolverines, mountain lions and Canada lynx. The area's east west juxtaposition between the relatively intact ecosystems of Greater Yellowstone and Central Idaho identifies it as a logical pathway for wide-ranging carnivores to migrate between populations and habitats in those ecosystems.

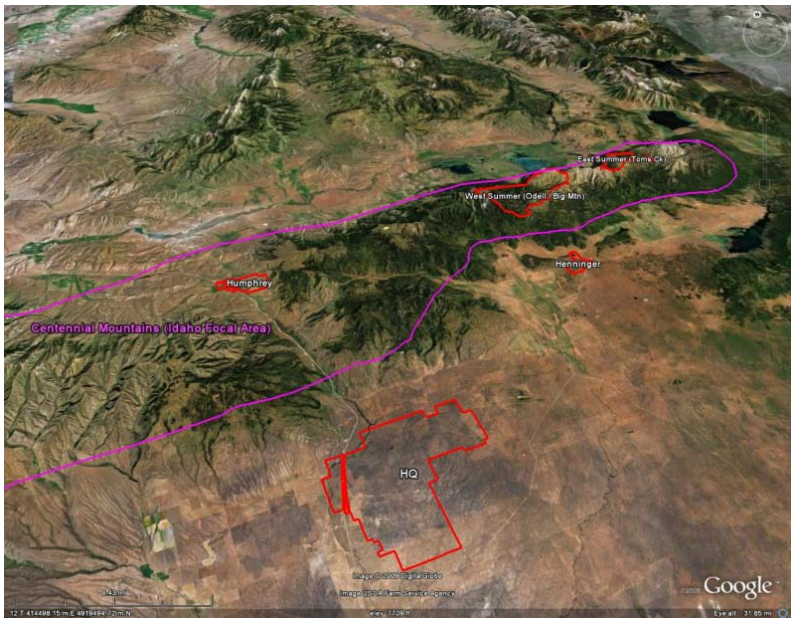

Figure 45. Centennial Mountain Focal Area (IDFG)

Background

The Western Governor's Association developed the *Wildlife Corridors Initiative Report* (2007) and established the Western Wildlife Habitat Council to identify key wildlife corridors in the west, and coordinate implementation of needed policy options and tools for preserving those landscapes. Primary drivers for this initiative are to address changes in land use, transportation, energy development, oil and gas, and climate change while preserving sensitive wildlife habitats. Statewide maps prepared for the corridors are depicted as large polygons or arrows that indicate where more detailed corridor mapping is needed. The Idaho Comprehensive Wildlife Conservation Strategy (CWCS) incorporated these key wildlife corridors through the delineation of "focal areas" which include the Centennial Mountains as an area of core grizzly bear habitat.

In 2007, a workshop was conducted with numerous biologists in attendance, to examine connectivity issues between the Greater Yellowstone Ecosystem and the Northern Rocky Mountains. The summary notes for this workshop, (Beckman et al. 2008) indicated:

- There is a need or desire to provide linkage habitats for wildlife, particularly wide ranging carnivores, between the Greater Yellowstone Ecosystem, Central Idaho, and the Northern Rocky Mountains.
- General agreement among the group that loss of linkage is due to rapid loss of valley bottom habitats from human population expansion and associated infrastructure.
- Themes emerged regarding issues related to livestock grazing and carnivore conservation including mistrust, lack of information sharing, ineffective compensation programs, and economic shifts (such as changes in livestock industry coupled with housing development in open spaces).
- The group is planning to reconvene in the future to identify and prioritize specific connectivity issues in the Centennial region.

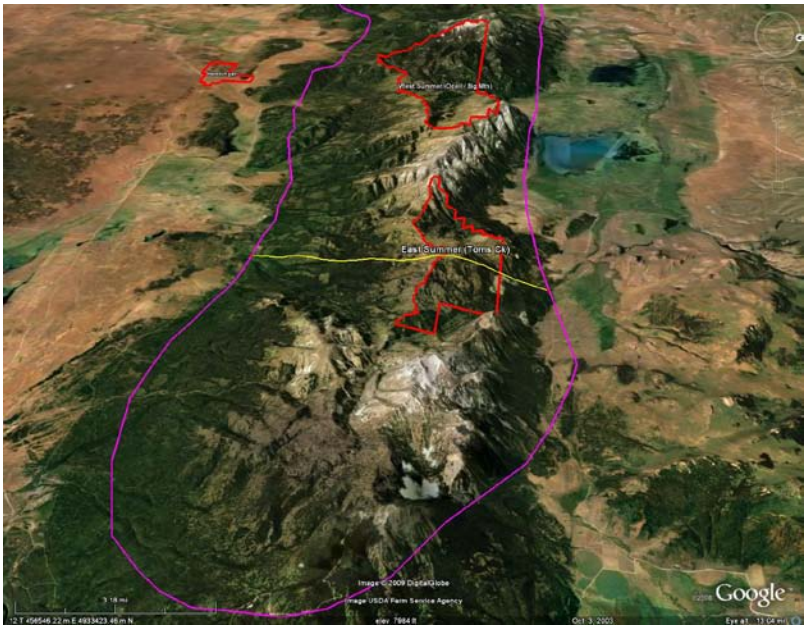

Figure 46. Centennial Mountain Focal Area, ARS properties, and available habitat for carnivore movement

The extent to which the Centennial Mountains are used by various carnivores is described previously in the individual species analyses (i.e. Canada lynx/wolf/grizzly bear existing condition sections). Beckman (scoping letters 2009, 2011) suggests that habitat quality is high, and various mapping exercises indicate that the area is an important connection between Greater Yellowstone Ecosystem and Central Idaho, particularly important for grizzly bears over the long term. In addition, he points out that a higher number of carnivore observations in eastern half of the Centennial Mountain Range compared to the western half of the range could indicate a bottleneck; and that if a bottleneck is occurring, the cause is unknown, and it is also unknown whether sheep station activities are contributing to that bottleneck.

In reviewing these comments it is important to consider the following points:

- Sheep Station activities use only a small proportion of Centennial Mountain Range in comparison to available carnivore habitat, approximately 10 percent (and less than 1 percent if considering the area occupied by domestic sheep at any given time).
- The primary linkage corridor of concern is in relation to the two species which are federally listed, grizzly bears and Canada lynx and suitable habitat that exists within and adjacent to ARS properties. However very few grizzly bear encounters have occurred on ARS properties. The range is thought to be unoccupied by Canada lynx, and there is no record of mortality for either species in association with the Sheep Station.
- Other species such as wolves, black bears, and mountain lions are not federally listed, are widespread, and are legally hunted in the region. Thus, Sheep Station activities are unlikely to be the major influence on movements and occupancy of those populations.
- Sheep grazing and associated activities in the Centennial range are "permeable", meaning that they do not form a physical or permanent barrier to carnivore travel and occupancy. Sheep bands only occupy two pastures at any given time, are moved rapidly through the area, and are temporary, using the Centennial Range only for a portion of the summer.
- Interstate 15 is a restrictive barrier in the area including the physical barrier of the highway corridor, disturbances from frequent motorized traffic, and increased human use and occupancy.
- In a proactive approach to further investigate the situation, an informal meeting occurred between the Sheep Station and Wildlife Conservation Society (WCS). The parties agreed to explore research questions for consideration pertaining to the use of ARS properties by carnivores, carnivore migration patterns in the Centennial Mountains, and effects of non-lethal control measures (such as moving sheep to avoid conflicts) on sheep production. If funded, rigorous experimental design would be used to obtain statistically solid answers to these questions, and thus improve knowledge of how to maintain large carnivores on the landscape while at the same time maintaining sheep production in those same landscapes. Once drafted, research proposals would be submitted into the outyear ARS budgeting process, and potentially become part of the approved Sheep Station research plan.

Connectivity Direct and Indirect Effects

Alternatives 1, 4, and 5

A review of the information discussed previously for individual carnivores indicates that Sheep Station activities are unlikely to reduce connectivity in the Centennial Range. ARS properties have minimal infrastructure on both Montana and Idaho parcels. Roads are few and closed to public use, so motorized traffic is kept to a minimum. Large carnivores can travel through and occupy habitat on ARS properties mostly without disturbance because of the large scale of available habitat, with sheep bands occupying only a small acreage at any given time in comparison to available habitat. Similarly, sheep are in the Centennial Mountain Landscape for a relatively short duration (July/August), with limited stay in any one area, and absent from each pasture one out of every three years. The range assessment demonstrates that utilization of available forage is light, particularly in the Centennial Range, which indicates that competition for available forage between sheep and the potential prey base (deer, elk, other species) is not a concern. At times, harassment from full-time sheep herders and/or guard dogs may cause individual carnivores to temporarily avoid a particular location when occupied by sheep. This avoidance would last only a few days as sheep are moved rapidly through the meadows, hillsides, and other forage areas

throughout the high mountain pastures. Should encounters occur that threaten livestock on ARS properties, lethal control actions would occur for wolves, black bears, and mountain lions, presumably at levels similar to past actions. Wildlife control actions related to livestock depredation and large carnivores has been limited over the past decade (see individual species write-ups for details). Should the need for lethal control increase for wolves beyond past levels (based on an increasing population or pack expansion), removal would only occur within approved management thresholds, because authorization would be granted or denied to APHIS Wildlife Services by the State wildlife agencies commensurate with their responsibilities for overall pack/population management. Lethal control of grizzly bears is not part of this proposal and would not occur without re-initiating consultation with the USDI Fish and Wildlife Service. There have been four grizzly bear encounters involving Sheep Station activities in the last decade, and no grizzly bears have been removed as a result.

Conclusion

In summary, the connectivity of carnivore habitat on Sheep Station and surrounding lands in the Centennial Range remains relatively undisturbed because human activity is low and sheep grazing activities are of short duration during the summer months while moving through pastures quickly. Sheep station policy is to proactively avoid encounters with carnivores, implemented through full time herders, guard dogs, movement of sheep, and occasional hazing of individual carnivores. Lethal control is implemented on the wide-ranging carnivores only when livestock is being killed or repeatedly threatened, and would not occur for grizzly bears. The Sheep Station is exploring research proposals which would describe and quantify carnivore movements in the Centennial Range, evaluate the effects of current grazing practices on carnivores, and address the effects of avoidance and other non-lethal control measures on sheep production and animal husbandry practices. Sheep station activities are permeable to carnivores, while other more restrictive barriers occur in the area such as the Interstate 15 corridor, landscape settlement/residences, and legal hunting seasons.

The effects of alternatives 4 and 5 are essentially the same as the proposed action. Lethal control actions on carnivores other than grizzly bears would occur on a limited basis when livestock are being killed. The varying numbers or concentrations of sheep relative to each alternative would not substantially change habitat conditions or carnivore movements within the corridor in comparison to the proposed action. The Centennial Range would continue to function as high quality habitat for wide-ranging carnivores, and would not be limited as a migration corridor or linkage.

Under alternatives 1, 4, and 5, carnivore use of the Centennial Mountain range would continue similar to the current condition, with additional potential for certain species (or individuals) to more fully utilize the current habitat within a given home range. Changes in the effectiveness of the Centennial Range as a wildlife migration corridor remain speculative, but are unlikely since evidence suggests that Sheep Station activities have a minimal effect to wide ranging carnivore use of the habitat. Grizzly bear would continue to occupy the range, but the already rare potential for encounters with Sheep Station activities would be eliminated. Long-ranging movements of grizzly bear in search of food sources would continue without potential of harassment from Sheep Station activities. Wolf conflicts which typically occur near the Humphrey Ranch property would no longer involve Sheep Station activities, however livestock conflicts on adjacent allotments and private lands could still occur, and warrant lethal control actions on a case by case basis. Black bears would continue to occupy the habitat without the need for lethal control. Mortality would continue based on black bear hunting season quotas which maintain sustainable populations. There would be no effect on wolverine movements since conflicts do not occur with Sheep Station activities and wolverine habitat would not change. Effects to mountain lion use of the Centennial Range are minimal since conflicts have only rarely occurred with domestic sheep, and lions predominately use the lower elevation areas of Henninger/Humphrey, which represent a small fraction of the overall corridor.

The direct and indirect effects of alternatives 2 and 3would be the same. Centennial Range would continue to function as a wildlife corridor similar to its current condition. However, removal of individual wide-ranging carnivores would be limited to encounters on private and other federal lands, and not as a result of Sheep Station activities.

Infrastructure

There are no federal laws and regulations applicable to infrastructure. The existing condition is considered the baseline for comparison of alternatives.

Infrastructure Affected Environment

Roads

Road locations are shown on each ARS property area map in the Maps section. There are 25 miles of existing system roads on the Headquarters Property (Figure 7, Map 5). No new roads have been developed in at least 15 years. Annual road maintenance is done on main roads as needed. Road segments with ruts or other maintenance needs are bladed or improved for efficient motorized travel. Each year approximately 20 miles of road need maintenance improvements. Road maintenance is contained within the road right-of-way.

An existing road through section 18 that ends at the horse corrals near the southwest corner of section 7, T15S, R1W in the West Summer Range provides motorized access. Motorized travel is limited to the existing road for camp tending and other management activities with some off road travel exceptions for maintenance operations that require supplies that are too heavy for pack-horse safety and welfare.

Recent off-road motorized use on the West Summer Range includes pickup travel in 2006 and 2007 for research at bed grounds in section 13, T15S, R2W and in section 8, T15S, R1W; four wheel drive tractor use for bridge reconstruction on Odell Creek crossing near the north line section 23, T15S, R2W in 2007; and a pickup and trailer were used to haul supplies to rebuild the Location 23 exclosure in 2008, one trip to haul supplies in and haul old materials out. All terrain Vehicles (ATVs) were used in 2007 to haul supplies for mine reclamation work on Big Mountain grazing unit. Camp tending and other management activities are done with horses. Occasional off road pickups, ATVs, or tractors are used for maintenance or research on off road sites.

Sheep Transportation by Truck

The sheep are trucked between grazing locations that are not contiguous or are not within trailing distance. Sheep are trucked from Headquarters to the Mud Lake Feedlot, Humphrey Ranch, and to Forest Service and Bureau of Land Management allotments (Table 36).

Table 36. The number of sheep trucked in and out each year for each range area and allotment

Property	Sheep
Humphrey	650 rams and ewes
Winter Range (USDA FS & BLM Allotments)	2,100 ewes (± 100 depending on year)
	200 rams
Mud Lake (DOE)	3,300 animals (± at shearing and breeding time)

There are permanent corrals and loading chutes at Headquarters, Mud Lake feedlot, Humphrey, and Henninger. At the Snakey-Kelly Forest Service allotment, sheep are unloaded on Forest Service Road 202. On the Bernice Bureau of Land Management allotment, sheep are unloaded on the allotment road at

the grazing site. Suitable roads and semi truck and trailer access are available at the loading sites. Trucking occurs on State Highways, County Roads, and National Forest system roads.

Headquarters and Mud Lake feedlot truck loading sites are similar in size and ground cover condition. Both truck loading sites have permanent corrals with bare soil similar to sheep pens. The Headquarters loading pen is 0.6 acre. The Mud Lake feedlot loading pen is 0.4 acre. The Humphrey and Henninger Ranch sites are similar. The loading corral at Humphrey is 0.4 acre and Henninger loading corral is 0.8 acre. The Humphrey and Henninger loading sites have low vegetation ground cover.

Trails

Sheep are trailed along existing roads to move sheep from Headquarters and Henninger Ranches to other grazing areas. Sheep are trucked to an unloading site on National Forest Road 202 and trailed along the roads to Snakey-Kelly allotment (see list of trails on page 26, Map 3).

Driveways[14]

See Table 3, page 27 for the sheep numbers trailed on pastures as an average of last five years.

Sheep are moved along driveways through timbered areas on East and West Summer Ranges. Herders on horseback use working dogs to herd sheep from one grazing location to another. There are about four miles of maintained sheep driveways through timbered areas on the West and East Summer Ranges. Sheep driveway locations are shown on Maps 14 and 16.

There are no sheep driveways on Headquarters, Humphrey and Henninger, the only maintained driveways are through timbered areas in the West and East Summer Ranges. Annual driveway maintenance is done through the timbered areas. Small diameter down wood across driveways is retained on site; some limbing may be done on retained down trees. Any new or recently fallen trees (greater than 10 or 12 inches in diameter) are cut out and removed (pulled back into adjacent timber stands) from the driveways each year. Occasionally sheep driveway trails are rerouted, closed, and rehabilitated. Driveways may be rerouted when a better route is located or an alternate route is needed for research. Only one reroute has been done in the past few years. Driveways through timber patches and across meadows are short, generally less than one half mile long. If adverse effects to soil or water occur, mitigation measures (cross drains with woody debris to divert overland flow) are implemented or a driveway segment maybe rerouted to avoid sensitive areas. Old driveways that are no longer needed or used, and unneeded corral sites are closed and rehabilitated; seeded with native species; and if available, brush or woody debris is returned to the site, and animals are kept off to restore the area.

At three to four week intervals, sheep are moved from grazing areas to staging areas for data collection. On these drives, sheep are spread out over larger areas in open terrain and moved slowly while grazing to reduce adverse effects on the travel routes.

The sheep driveway crossing on Odell Creek in section 11, T15S, R2W has bare soil, 10 feet wide for about 150 feet, on the south side of the crossing on 15 to 20 percent slope. The narrow trail to the west of the crossing is developing into a trench from overland water runoff. Suggested mitigation to this crossing site is described in the effects section. The sheep driveway crossing on the south fork of Odell Creek near the south line, section 14, T15S, R2W, is low impact, with grass and forb cover.

[14] Driveway: Travel route used to herd sheep from one grazing location to another; sheep spread out over larger areas in open terrain, move slowly while grazing

Fences

There are about 180 miles of permanent sheep fence on Headquarters, and Humphrey and Henninger Ranches. All fences are inspected and repaired annually. Fence locations, including exclosures, are shown on various maps. Fence types (exclosures - Figure 10, coyote-proof - Figure 18) are shown and described in the map legends.

Pasture Fences

Sheep proof fences at Headquarters, Humphrey, and Henninger are maintained to confine sheep. An eight foot high coyote proof fence is maintained at Headquarters around, and subdividing, section 2, T10N, R36E, for coyote-sheep interaction research.

Horse Corral

The horse corral fence on West Summer Range, (Odell grazing unit) was constructed and is maintained to confine horses used for sheep trailing, camp tending and other sheep grazing management and research activities (See Map 15). The north and west part of the horse corral is sheep proof net-wire with two strands of barbed wire above the net-wire. The south and east portion of the corral is two strand barb wire. All of the corral fencing on Odell grazing unit is let-down type. The drop fence is let down each year after grazing operations are complete.

Exclosures

Exclosures at Headquarters are sheep proof, maintained to exclude sheep from grazing excluded areas. The West Summer Range exclosures are drop fences, put up to exclude sheep when pastures in the exclosure areas are grazed. These drop fences are let down after sheep are removed from the pasture.

An eight feet high wildlife exclosure fence in section 7, T15N, R15S, Odell pasture, is maintained to exclude wild ungulates and sheep. An adjacent four foot-high sheep proof exclosure is maintained to compare grazing effects. This wildlife and sheep exclosure includes a riparian area. These exclosures are located and designed to compare and evaluate domestic and wild ungulate grazing effects on willow and other riparian vegetation. The entire fenced area is less than 1/2 acre.

Firebreaks

After a 2000 wildfire, a two mile long firebreak was reestablished to protect Sheep Station Headquarters buildings and research plots on the Headquarters Property (Map 5). The firebreak around the Headquarters area is maintained annually with a motor grader to provide a mineral soil break about 20 feet wide. Chemicals may be used to control noxious weeds on the Headquarters firebreak. Weed management is described in the pest control section below. Firebreaks 15 to 20 feet wide down to mineral soil are constructed around prescribed burn areas including blackline burn areas.

Prescribed burn firebreaks are constructed with a dozer and motor grader. Unit firebreak lines and blackline firebreaks are generally within 50 to 200 feet of each other. Cleared firebreaks around burn units are also used for vehicle and equipment access during burn operations and for research during and after the areas are burned. Shrub and grass debris removed from fuelbreaks is pulled back and spread over the cleared area on firebreaks not needed for research access after the burn, generally within the same season.

Fire breaks around prescribed burn areas are not maintained. They are not seeded and are left to revegetate with native species. Fire breaks not needed for motorized access are rehabilitated. Windrowed shrubs, grass, litter, and top soil are pulled back and spread over the firebreak with a motor grader. Invasive, noxious weeds have not been a problem on the cleared firebreaks. *Bromus tectorum L.*

(cheatgrass), present since 1930s, shows up on some cleared areas but is not persistent at this elevation or environment.

Infrastructure Direct/Indirect and Cumulative Effects

The direct/indirect and cumulative effects area includes the ARS properties, the Department of Energy Mud Lake Feedlot, and the Forest Service and Bureau of Land Management allotments; because these areas include the infrastructure used by the Sheep Station to manage sheep grazing. The timeframe includes the next five years, because that is the timeframe within which management activities can be reasonably predicted.

The changes in infrastructure use for alternatives 1-5 are displayed in Table 37.

Table 37. Infrastructure changes from the proposed action by alternative

Component	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Roads	Roads would continue to be maintained as needed. No road construction is expected.	Only roads connected to the Headquarters facility would be maintained	Roads would continue to be maintained as needed. No road construction is expected	No change from existing	
Sheep Transportation by Truck	There would be no change to sheep transportation by truck.	The only transportation of sheep by truck would be between Headquarters sheep pens and Mud Lake	Sheep would continue to be transported to the winter range and Mud Lake by truck		
Trails	There would be no change in the use of sheep trails.	The sheep trails and driveways would not be used	Sheep would continue to be trailed to Henninger and to Snakey-Kelly	Sheep would continue to be trailed to Henninger, Snakey-Kelly, and West Summer	Sheep would continue to be trailed to Henninger and East and West Summer
Driveways	There would be no change in the use of sheep driveways.		No driveways would be used	Driveways in West Summer would continue to be used	No change from existing
Fences	Fences would continue to be maintained as necessary.	No fences would be maintained	Fences would continue to be maintained as necessary	No change from existing	
Firebreaks	Firebreaks would continue to be maintained and constructed as necessary.	Only the firebreak around the headquarters area would be maintained	Firebreaks would continue to be maintained and constructed as necessary		

Sheep

The Sheep Station currently has approximately 3,300 mature sheep, plus attendant young sheep for research purposes. Including mature ewes and lambs, lambing rates are approximately 170 percent, and weaning rates are approximately 145 percent. The total number of sheep soon after the end of the lambing period is approximately 6,500. The numbers of mature and young sheep retained vary according to research needs. Sheep in excess of those needed for hypothesis-driven research are not retained. Sheep Station sheep harvest most of their feed through grazing. Sheep numbers are kept below range carrying capacity to maintain favorable range conditions. In the fall, excess sheep are sold.

There would be no change in existing sheep numbers from the existing condition under alternatives 1 (proposed action) and 4. Alternatives 2, 3, and 5 would each require a reduction in the numbers of sheep that could be retained at the Sheep Station for research purposes. Excess sheep would be either sold or destroyed. For a number of reasons, some research animals cannot be sold for breeding stock or go into the food chain. In those cases, the animals must be retained until they die of natural causes or are euthanized (i.e., destroyed), and their carcasses are rendered inedible and disposed of properly (carcasses can be disposed of in a legal landfill). Listed below are some of the types of sheep that the Sheep Station now euthanizes, instead of sell, when they are no longer part of a research project. If the Sheep Station were forced to terminate research projects, all of the sheep (approximately 200) of the following types would be euthanized instead of sold.

- Sheep with genotypes that make them susceptible to certain diseases: These genotypes occur naturally. Some of the sheep with these genotypes are used for research to gain an understanding of the relationship between genotype and onset of disease (i.e., mechanism of action); study the onset and natural progression of certain diseases; develop genetic tests that can be used to reduce the frequency of sheep with genotypes that make them susceptible to certain diseases; develop genetic tests that can be used to produce sheep that are resistant to certain diseases; produce effective vaccines; and improve the care of sheep that develop certain diseases.
- Sheep that have been treated with experimental pharmaceutical compounds.
- Sheep that are part of research to quantify the effects of certain naturally occurring diseases on lifetime productivity.
- Sheep that have been ovariectomized and used for various research projects.

Table 38 displays the adjustment in sheep numbers from the proposed action that would need to be made for alternatives 2-5 based on the reduction of grazing areas.

Table 38. Sheep number adjustments by alternatives 2-5

Sheep	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Number of sheep to be retained	1,155	2,640	No Change from existing	2,310
Percent of Existing herd retained	35%	80%		70%
Numbers of sheep to be disposed of	2,145	660		990
Percent of Existing herd disposed of	65%	20%		30%

Soils

Soils Affected Environment

For a detailed discussion of the Soils Affected Environment see the Soils Report in the project record.

For the Headquarters Property and Henninger Ranch, the degree of soil development on the lava flows is a strong indicator of potential productivity. Lava ridges have very poor productivity potential compared to adjacent concave shaped swales that have accumulated sediment over time in response to water erosion/runoff from exposed bedrock. The basalt exposures, also known as pressure ridges, have lithic soils less than 20 inches deep to hard bedrock, with exposed bare mafic lava rock on the surface. Forage production varies from 250 to 800 pounds per acre on the pressure ridges (USDA NRCS 1991). In contrast, soil development and productivity are accentuated by the microtopography of the lava flows where swales continue to trap alluvial (water-born) and aeolian (wind-blown) sediment. Old alluvium and aeolian deposition from nearby mountain glaciers and Pleistocene-aged Lake Terreton, once located at the foot of the Centennials, provides fine sediment for much of the soil profile (Stevenson 1993, Hiett 2009 personal communication). Production ranges from 1200 to 1600 pounds of forage per acre within these swales based on range site information (USDA SCS 1981, USDA NRCS 1991).

The productivity contrasts on the lava plain are highlighted by the vegetation. The lava pressure ridges support sparse sub-shrub communities compared to adjacent communities where grasses are dominant on deeper, more productive soils. More generally, vegetation includes: three-tip sage (*Artemesia tripartita*) as the dominant vegetation; with needle and thread (*Hesperostipa comata*), bluebunch wheatgrass (*Psuedoroegenaria spicata*), prairie junegrass (*Koeleria macrantha*), and sandberg poa (*Poa secunda*) typical grasses. Cheatgrass (*Bromus tectorum*) tends to occupy these less fertile areas in occasional small, less than half-acre clumps.

Soils deepen dramatically to greater than 60 inches in landforms characterized by concave shaped swale bottoms where thicker topsoil and subsurface clay accumulation provide increased water holding capacity and cation exchange capacity. Both these positive and productive attributes support native and introduced pasture grasses. The swale indicator species are basin big sagebrush (*Artemesia tridentata* spp. *tridentata*) and basin wildrye (*Leymus cinereus*).

Soils on the lava plain can also vary according to the type of lava flow; the rough surface aa lava breaks to coarse rock that allows for deeper development and efficiently catches Aeolian (wind-blown) sediments while the smooth pahoehoe lava formed a viscous and smooth surface that is prone to wind scour. Soils on both Henninger Ranch and Headquarters are over pahoehoe and aa lava.

Across the lava plain, the shift in moisture to the northeast increases the potential vegetative productivity, with subsequent increase of fescue grasses (*Festuca* spp.) closer to the Centennial Mountains. Rainfall increases to 16-22 inches, creating an even-tempered growing environment with most of the carbonates in soil leached to a lower depth below the effective rooting area. The loss of carbonates is marked by increases in mountain big sagebrush (*Artemesia tridentata* ssp. *vaseyana*) and Idaho fescue (*Festuca idahoensis*) (Ecosite B13-05, B13-39, USDA NRCS (In development)). This increase in moisture is most evident in the Henninger pasture where the lava pressure ridges support aspen (*Populus tremuloides*) instead of sage. The plantings of crested wheatgrass in the southwest corner of Headquarters correlate to the low productive conditions from high carbonates and very low precipitation. These areas represent an altered plant community from the historic vegetation (Ecosite B11b-R011BY010ID, USDA NRCS (In development)).

Henninger Ranch soils have greater depth than Headquarters soils because of alluvial deposits with underlying glacial outwash from the Centennial Mountains. This alluvium creates flat surfaces, resulting in dry meadow conditions that support hay production fields. Silver sage (*Artemesia ludoviciana*) and mules-ears (*Wyenthia amplexicaulis*) are the prominent indicators of these semi-wet meadows along with associated vegetation species: death camas (*Zigadenus venenosus*), sedge (*Carex* spp.), and pasture grasses (Kentucky bluegrass (*Poa pratensis*) and timothy (*Phleum pratense*)). These soils have a very dark brown to black surface horizon, high in organic matter, characteristically formed under grass; with clay subsoil, which have good productive capacity (R013XY039ID, USDA NRCS (in development)). Adjacent footslopes have moderately steep slopes with inceptic soils, which are very young soils with low nutrient status (R013XY005ID, USDA NRCS (in development)). Range production is upwards of 1,800 pounds forage per acre for hillocks and benchlands, compared to 1,400 pounds forage per acre on alluvial flats for average years.

Soils at Humphrey vary highly due to the minor slump (mass wasting) terrain. Ridge soils are lithic (shallow, less than 20 inches over hard bedrock) and skeletal (more than 35 percent rock (coarse) fragments ≥ 2mm by volume below 10 inches) with poor site quality. Back slope concavities are prone to form from the unconsolidated nature of the parent material; old alluvium gravels and cobbles from the Beaverhead formation. These “slips” form catchments that have deep soils below. Across a hill slope, soil depth varies from moderately deep too deep with dark topsoils; which are 20 inches to 40 inches and greater than 40 inches deep respectively. Productivity varies accordingly with the soils below catchment areas supporting robust grassland species. Mountain sage is the dominant component along with Idaho fescue and mountain brome.

The soils on the Summer Range have strong relationships with aspect and slope location or position on the landscape, which heavily influence productivity and vegetation. Moderately-deep loamy soils (20 to 40 inches deep) occur on ridgetops and hillslopes that support rich forb and short grass communities with forage production in the realm of 1,000-1,200 pounds per acre on windswept ridges, and 2,000-2,400 pounds per acre on deeper soils on protected gentle to rolling slopes. Topsoil contains a high percentage of organic matter since forming from forb and grassland vegetation. Conifer thickets on side slopes and within protected aspects, shift forest floors to forest herb and conifer litter, with production of forages less than 200 pounds per acre.

Shifts in geology from igneous and metamorphic rocks to sedimentary limestone or shales can lead to shallow and less productive soils. Within soils forming in limestone and shale parent materials, steep armored gravel slopes support a sparse shrub layer and clumped conifers. Toms Creek is a good example of where a contact exists between sedimentary and volcanic rocks in the upper watershed. The western portion of the watershed has steep graveled slopes with sparse snowberry (*Symphorocarpos* spp.) and conifer clumps on shale and limestone, compared to the forb- and grass-rich eastern portion of the watershed on mafic volcanic material.

Soils Environmental Consequences

Spatial and Temporal Context for the Effects Analysis

The spatial boundaries for soils direct, indirect and cumulative effects are the discrete ARS properties Headquarters, Henninger, Humphrey and the Summer Range because soil processes occur largely in-place.

The BLM and USDA Forest Service grazing allotments were established under separate NEPA analysis and documentation, and they concluded the grazing activities permitted were not detrimental to soil productivity. Because the BLM and FS grazing allotments are not adjacent, connected or otherwise

contiguous to each other, or to ARS properties, there could be no cumulative effects among these properties.

Effects occurring within ten years are considered short term, while long-term impacts are typically greater than 10 years. Short-term impacts are considered recoverable, with regrowth established and no displacement of topsoil. For long-term impacts, vegetation is slow to re-establish, and soil is partially removed by physical displacement and/or water and wind erosion processes, with slow to limited recovery of projected productive potential.

Direct and Indirect Effects

Alternative 1 - Direct and Indirect Effects

The proposed action would continue sheep grazing and associated supporting management activities. The current soil conditions appear functional at all ARS properties. Bare soils are in the expected range for all areas sampled, and evidence of soil erosion is rare. Some compaction is evident on intensely used areas (e.g. around watering troughs, sheep driveways, bedding areas). However, soil properties/conditions (i.e. soil moisture, texture) for optimum compaction on lands normally grazed is minimized by dispersed use and rest rotation, limiting compaction that may be potentially detrimental to soil properties and qualities to seasonal periods (e.g. late April to Mid-June) when soil water content/compressibility is highest. Some recovery of soil physical condition/function (e.g. unsaturated hydraulic conductivity and bulk density) can be measurable in the short-term with rotational grazing and natural processes, such as wetting and drying cycles, freeze and thaw cycles, plant root growth and decay, and soil fauna and flora activity. From a soil physical standpoint, all areas are functional and do not show overt signs of degradation.

Other effects considered are the impacts of grazing-related actions such as fence building and road-grading (see Proposed Future USSES Projects for Ground Disturbance in project file). On the Headquarters area, approximately 120 miles of dirt-surfaced roads, most on flat terrain and many having a gravelly surface with some vegetation on the roadway are subject to wind-blown fugitive dust, and localized sheet and rill erosion in response to intense, longer duration rainfall events. Although these potential effects are viewed as minimal, in that fugitive dust is limited due normal formation of a physical crust, limited vehicular traffic, and occasional maintenance by motor grader (< than 20 percent of road miles annually) and erosional sediment would be trapped in roadside vegetative cover or where undulating surfaces and/or litter, etc. is present to trap sediment. Soil productivity would be maintained.

In addition, about 14,000 linear feet (2.65 miles) of firebreak is maintained/rough graded by motor grader annually. About 10 acres of bare mineral soil, including unsurfaced roads, is potentially subject to erosion from wind and from overland water flow from intense, longer duration rainfall events, and wind. Likewise, about 15 acres of bare soil could be created by dozer and motor grader each year in support of the Station’s prescribed annual burning program.

The overall plan is to burn Headquarters pasture areas about every 30 years, this could equal prescribed burning of approximately 900 acres each year. Actual burned area over the past 30 years, 13,867 acres, has been less than the planned average 900 acres per year.

In the next five years, the Sheep Station plans to burn 400 acres per year. However, since the burning cycle yields a return cycle of once every 30 years these acres are allowed to fully recover their vegetation cover within two to three growing seasons. Erosion and sedimentation therefore, is of low risk to soil productivity and water quality.

Indirect activities considered are range stewardship activities such as prescribed burning and treatment of noxious invasive weeds. The latter is done through a combination of targeted grazing by sheep and use of herbicides (appendix C).

Grazing effects

Using vegetation as an indicator of soil health, the current vegetation composition for Humphrey and the Summer Range appears stable, showing no signs of degrading range conditions. Reports on trend for the Summer Range by Klements (1997) and VanHorn-Ecret (1986) show the composition of vegetation within exclosures installed in the 1960s does not differ substantially from the composition outside exclosures. Humphrey has a strong presence of desirable native range species and approaches the expected sagebrush community type based on the Natural Resource Conservation Service range sites (SCS 1981). These conditions should persist given the long history of managed grazing by the Sheep Station. The low utilization of six percent at Headquarters and 14 percent at Humphrey, along with the varied staging/gathering of sheep throughout the year; has resulted in the conditions observed. At Henninger, grazing use observations and higher utilization (24 percent) compared to the other properties, indicate a downward trend (see Range Report 2011), possibly related to the altered hydrology regime from historic downcutting of Dry Creek and irrigation diversion.

Localized areas of soil disturbance associated with sheep driveways and bedding would continue to occur, though the vegetation appears stable, healthy, and robust enough to recover seasonally, and no chronic erosion is occurring. Sheep on bedgrounds generate a substantial amount of nutrients from manure and urine. In addition, bedding reduces the amount of standing vegetation and can potentially increase the amount of bare-exposed soil from disturbance, and cause some compaction. However, infiltration rates would remain high. Only a rare storm occurrence (i.e. greater than or equal to 100 year-24 hour rainfall) yielding a high intensity, long duration precipitation event, would runoff occur above background or historical occurrence could potentially cause erosion damage and transport suspended sediment, particulate matter (manure) and dissolved solids/nutrients off-site; resulting in adverse effects to potential soil productivity and water quality.

Headquarters

Soil function would continue at Headquarters with vegetation composition aligning with expected diversity and species representation (USDA Natural Resource Conservation Service (in review)) on the shallow and moderately deep soils. Bottomlands have more divergent species mixes with a higher abundance of pasture grasses in addition to 10-15 percent of the property planted with crested wheatgrass (*Agropyron cristaetum*) to improve forage. The productive swales have an influx of exotic pasture grasses due to the richer soil. In these arid environments, higher productivity sites have a propensity for supporting exotic species (Lejuene and Seastedt 2001, Bashkin et al. 2003). Vegetation composition would persist in the Headquarters areas, although crested wheatgrass could expand.

The presence of exotic grasses such as the planted paddocks of crested wheatgrass and pasture grasses impacts the soil biotic community (Wardle et al. 2004, Wolfe and Klironomos 2005), but does not lower productivity per se. Expansion of the perennial grasses would have less impact than expansion of cheatgrass (*Bromus tectorum*) (Norton et al. 2007). Predominance of cheatgrass changes the moisture regime in soil with finer root structure and different litter quality, ultimately shifting the fertility regime to favor itself, an unwelcome departure from conditions preferred or desired for adaptations by competing native species (Belnap and Phillips 2001, Thorpe and Callaway 2005, Norton et al. 2007). Currently, cheatgrass is relatively sparse across the range; ≤ 1 percent The presence of the exotic perennial grasses would most likely show changes in arbuscular mycorrhizal assemblages (Wardle et al. 2004) but not impact resources such as nutrients and water (Norton et al. 2007).

Henninger Ranch

Henninger shows degradation on the sage flats where conditions have departed from the expected community (see USSES Range Report 2011, USDA Natural Resource Conservation Service (in review)). Species composition is stable with pasture grasses and grazing increaser forb species, but lacks native grass species. The current condition shows a downward trend, although no obvious evidence of erosion was observed. Historical grazing at the site along with evidence of dewatering from entrenched drainages suggests a shift in the water table. This site also has irrigation, both at the site and from adjacent land users. The upland sage community has likely expanded into bottomland areas though the extent is uncertain.

Henninger uplands show fair conditions with plant species diverging from the historic community. The exotic perennial grass smooth brome (*Bromus inermus*) is common, indicating past seeding, which may interfere with recolonization of native grass species. Observations found that upland rocky areas where conifers and aspen predominate are closer to the expected plant assemblage. That said, this area gets higher sheep use at 24 percent utilization than all other ARS properties (see Table 39). The forested upland areas are stable, soil erosion is sparse at the site.

Humphrey Ranch

Continued sheep grazing at Humphrey would not substantially change soil resources from existing conditions. This area has moderate use at 13 percent (Table 39) and the vegetation is close to the expected range for this area. Overall, vegetation is robust, diverse and soil erosion not evident outside the bare slope zones from small landslip. These bare slope areas are considered a natural feature and continue to supply water to deep soils in adjacent swales below. Soil development is a century to millennium process. The very dark accumulated organics in these swales compared to much shallower adjacent hill slope soils, suggest that these slips/shallow slope failures are a natural ongoing process.

Riparian soil impacts are mixed at Humphrey. Sedge meadow soils appear intact with minimal impacts for the north tributary of Beaver creek on Humphrey. Willow sedge soils along a quarter mile of southern Beaver Creek tributary would continue to experience seasonal impacts from sheep watering. Canada thistle and upland species along the banks here show historical grazing use at the site. Given the long history and steady grazing numbers, the conditions would likely stay the same with continued grazing.

Summer Range

The Summer Range shows abundant productive capacity given the higher precipitation regime and vegetation state than on the lowland properties. Current vegetative assemblages suggest a stable vegetation community. Keith Klement found no outstanding differences for vegetation inside and outside exclosures during his 1990s sampling (1997). Sampling during summer 2009 showed vegetation within expected ranges for the sites compared to the soil surveys in the 1990s (see USSES Range Report 2011, Natural Resource Conservation Service 1991). Given the similar management regime to the 1990s, the existing range and soil conditions would continue.

Some bare soils from annual operations were observed, but do not show chronic erosion sign. Soil disturbance from sheep drives is temporary and groundcover restored with regrowth. Past evidence of bare soils and degraded conditions is referenced (Klement 1997) and reported for Toms Creek in the middle 1980s (Montagne 1988). Bare soils are isolated and related to sheep bedding on ridges, past impacts from combination of old wildfire and/or historic grazing practices (Klement 1997), and natural bare slopes related to snow patches on protected aspects. Sheep bedding areas are typically scattered and less than one quarter acre each. The chronic erosion patch observed is one-quarter acre and continues to

sheet wash. This area is not grazed. The snow slopes are steep, un-vegetated slopes and therefore experience only transient use by sheep.

Sheep impacts on the nutrient regime are most prevalent at bedding sites. A recent study by Leytem and Seefedt (2008) for sites on the Sheep Station Summer Range highlights the changes. The bedding sites have reduced vegetation and this translates to lower organic carbon and long-term nitrogen (total N). The input of sheep feces offsets the lack of vegetation somewhat with spikes of ammonium (NH4-N) and soluble phosphorus (P), although overall the bedding areas experience a net loss of nutrient potential (Leytem and Seefedt 2008). The impact of these conditions can influence the vegetation at these bedding areas although specifics were not given in the study. More opportunistic vegetation is associated with these spikes (Vinton and Burke 1994) with exact characterizations dependent on grazing history and ecological context (Milchunas and Laurenroth 1993, Biondini et al. 1998).

Nutrient impacts from sheep grazing outside of the main congregation areas such as bedding areas are not expected. Areas outside of the bedding areas are well vegetated. Therefore shifts in nutrient cycling due to urine and manure would not occur. The dispersal of sheep and low utilization of available forages diminishes potential impacts.

Overall the Summer Range has likely improved from the 1980s because of rest rotation, eliminating one band of sheep (1,000 animals), and emphasizing herding for light, even use by sheep. Adaptive management principles emphasize even usage by the sheepherders and avoiding low productivity sites. The poor conditions cited by Montagne (1988) at Toms Creek were initially monitored for grazing effects, and later closed to grazing altogether due to low availability of forage, and snow displacing the monitoring exclosure fencing (Jacobson 2009, personal communication).

Table 39. Percent utilization with the existing proposed action (Alt 1) versus the no grazing alternatives

Properties	AUM Available	Existing Alt1	Percent of Available AUMs used by Alternative			
			Alt2	Alt3	Alt4	Alt5
Agricultural Research Service Properties	**48,667**	**6.8**	**0.0**	**5.9**	**7.0**	**4.0**
Headquarters	28,353	5.6	0.0	9.1	5.6	3.9
Humphrey	4,476	13.5	0.0	0.0	13.5	9.4
Henninger	1,914	23.8	0.0	15.5	24.6	16.6
East Summer Range (Toms Cr.)	4,043	3.8	0.0	0.0	0.0	2.7
West Summer Range (Odell Cr./Big Mt.)	9,881	5.1	0.0	0.0	7.2	3.5
MOU Allotment total (DOE, USDA-FS, DOI-BLM)	**26,087**	**5.8**	**0.6**	**3.9**	**5.5**	**1.4**
Mud Lake	560	28.6	28.2	28.2	28.6	29.6
Snakey-Kelly	1,756	24	0.0	19.2	24	0.0
East Beaver	17,887	1.2	0.0	0.0	1.2	0.8
Meyers Creek	3,076	2.3	0.0	0.0	0.0	1.6
Bernice	2,808	23.2	0.0	18.5	23.2	0.0

Invasive plants

The control of invasive plants advances soil productivity by limiting the spread of weeds capable of adversely influencing soil function/properties and qualities. Containment and eradication strategies pose a risk of adverse effects from select grazing and herbicide use. Select grazing can result in overgrazing of non-target species if grazers are mismanaged. The most common herbicides used, Curtail (2,4 D), Krovar

(Bromacil and Diuron), and Roundup (Glyphosate) have minimal adverse effects on soil biota, but do vary in leaching and runoff potential. Krovar has particularly high risk for offsite transport to groundwater and runoff.

Select sheep grazing and herbicide spraying are used to contain the spread of invasive plants. The main species targeted are leafy spurge (*Euphorbia esula*), spotted knapweed (*Centaurea stroebe*), and cheatgrass (*Bromus tectorum*). Minor infestations are noted for hoary cress (*Cardaria draba*), lambsquarters (*Chenopodium album*), kochia (*Bassia scoparia*) and thistle (*Cirsium* spp.). Handspraying targets roadsides, feedlots and corrals, and near structures. Broadcast spraying is done with a four-wheeler or tractor in small pastures and large feedlots. Aerial application is not used. Roughly 50 acres are sprayed annually (Table 40).

Table 40. Herbicide general use, types and location

Herbicide	Active ingredients	Area	Frequency	Acres	Notes
Curtail	2,4 D (39%) and Clorpyralid (5%)	Headquarters roadsides +/- 5 m	Annual	35	Leaches, esp. sandy soils and shallow water tables
Curtail	2,4 D (39%) and Clorpyralid (5%)	Humphrey roadsides (+/- 5 m) and fencelines (+/- 2 m)	Annual	10	Leaches, esp. sandy soils and shallow water tables
Krovar	40% Bromacil (40%) and Diuron (40%)	Headquarters feedlots	Annual	2	leaches readily, long half-life in soil
Roundup	Glyphosate (48%)	Humphrey pasture reseeding	One time	12	Strong sorption to soil

The ecological, and thus soil related, implication is notable for leafy spurge, spotted knapweed, and cheatgrass. These plants are pervasive in arid rangelands. The success of these species may be due in part to positive feedbacks they create in the soils as self-sustenance, in addition to lack of predators such as soil pathogens (Thorpe and Callaway 2005, Wolf and Klironomos 2005). Cheatgrass changes soil structure and can influence nutrient content and timing (Hawkes et al. 2006, Norton et al. 2007). Spotted knapweed may “mine” phosphorus unavailable to other species (Thorpe et al. 2006) in addition to altering nutrient cycles with its root exudates (Thorpe and Callaway 2005).

Selective grazing by sheep is documented as effective for control and eradication of leafy spurge and spotted knapweed (Olson and Lacey 1994, Tu et al. 2003). Selective grazing for leafy spurge has reportedly resulted in up to 90 percent eradication (Olson and Lacey 1994), while spotted knapweed control is mixed, probably due to the bittering agent cnicin found in the leaves (Whitney and Olson 2006). It would make sense that select grazing would benefit soils by moving plant community structure toward native composition.

Herbicide treatment on the ARS properties is outlined below. The main herbicide used is Curtail which is a mix of 2,4 D and clopyralid. Roadsides and fence lines at Headquarters are the main targets for control of weed infestations with an average annual treatment of 45 acres. Secondarily, Krovar – a composition of Bromacil and Diuron – is applied to the two acres of Headquarters feedlots. A recent pasture reseeding at Humphrey Ranch used Roundup (Glyphosate) for 12 acres. Other herbicides with some prior use at the Sheep Station, though not used regularly, include Arsenal (impazapyr), Tordon (picloram) and Garlon (triclopyr).

Herbicide application indirectly benefits soil function by containing the spread of noxious weeds, particularly those that alter soil nutrient regimes. Most of the spraying focuses on weed containment and

eradication along travelways and high-disturbance areas such as the feedlots. Adverse impacts on soil organisms overall is not expected given the low toxicity listed by Tu et al. (2003) and using application rates within label restrictions. Decomposition of all listed herbicides is primarily by soil microbe metabolism.

However, certain suites of microbes are sensitive to Tordon (picloram), Arsenal (imazapyr) and Garlon (tryclopyr). Tordon has some toxicity to certain fungi at high application rates and is known to affect the nitrification portion of the N mineralization cycle (SERA 2003a). Garlon is toxic to some soil bacteria at low and high doses (2004). Arsenal has slight effect on soil microbes at high doses (SERA 2004).

Herbicides are typically used on disturbed areas such as roads and feedlots. These areas are characteristically compacted and barren, and may increase herbicide residence time. Soil chemical and biological processes are key to the breakdown of herbicides, so impaired conditions can lead to longer residency. Krovar and Tordon have relatively long residence times in soils, with soil half lives in the order of a year or more (Extronet 1993, SERA 2003a); while Roundup and Garlon have short residency times in soil, at 47 days (SERA 2003b) and 30 days (SERA 2004) respectively. It should be noted that these half-lives are averages and vary depending on the amount of moisture available, organic matter and warmth for soil processing (Bollag and Liu 1990).

Krovar, Tordon, and Curtail have moderate to high leaching potential and can contaminate groundwater if used near shallow aquifers (Extronet 1993, Dow 2008, Dupont 2008). Herbicide buffers are recommended to ensure adequate protection (see Protocols, Appendix C - ARS Sheep Station Integrated Invasive Plant and Weed Control). Roundup has a very strong affinity to soils and thus has the least potential for affecting groundwater. Once absorbed by soils the herbicide is degraded by soil microbes and is unavailable to plants.

Prescribed Burning

Short-term adverse impacts to soils from severe burning are not expected from either fall or spring burning as fuel loads are light, resulting in fires of shorter duration and less soil heating. Nor are erosion rates predicted to increase given the low seasonal rainfall. Prescribed burning is expected to increase mineral forms of N and P in the short term (1-2 years), with long-term effects uncertain. Soil biota and productivity would be adversely affected with expansion of cheatgrass.

Prescribed fire generally increases mineralization cycles in the short-term (Fisher and Binkley 2000, Erickson and White 2008) with long-term consequences depending on the vegetation and soil biotic conditions (Hart et al. 2005). Plant available nitrogen and phosphorus increases for the first year, while increases in sagebrush systems of up to four years for nitrate are reported (Rau et al. 2007). Mackenzie et al. (2006) have found elevated nitrate in nearby forested systems for up to 60 years. The effects are highly dependent on biological substrate and precipitation since mineralization is a soil biotic process (Hart et al. 2005, Rau 2007).

Cheatgrass is of particular concern with regards to changes to the soil nutrient regime and the risk of more frequent flashy fires (D'Antonio and Vitousek 1992, Norton et al. 2007). These sagebrush regimes appear sensitive to the increased fire frequency associated with cheatgrass expansion (USDA Natural Resource Conservation Service (in review), Zouhar et al. 2008). Cheatgrass invasion is thought to occur during high moisture years and may actually decline in drought (Zouhar 2008). Sheep Station personnel have not observed cheatgrass expansion in the mountain big sagebrush vegetation types where they are burning.

Alternative 1 – Conditions on Non-ARS Lands Used by the Sheep Station

Of the grazing allotments under MOUs utilized by the Sheep Station, Meyers Creek and East Beaver Creek (National Forest System lands) are grazed in summer to early fall when soil conditions are capable of supporting managed grazing with slight risks of adverse impacts to soil properties and qualities, particularly with sheep numbers ranging between somewhat less than 10 percent to less than 20 percent of the authorized/permitted number by the USDA Forest Service, with a very light forage utilization that ranges between 2.3 and 1.2 percent respectively. On the Snakey-Kelly (National Forest System) and Bernice (BLM property) allotments, used for winter grazing, a period when soil conditions are most favorable for protecting soil productivity (e.g. low soil moisture, thus potential compaction, and likely frozen soil in the upper soil horizons) the number of sheep are less than 20 percent of authorized/permitted numbers, and utilization is less than 25 percent of available forages. The Mud Lake property (DOE), with exception of the feedlots, is grazed during two seasonal periods, winter to early spring, and late fall. Risks to soil productivity are moderate in the spring with increasing soil moisture, decreasing to slight as the grazing progresses; soils possess fair to good suitability under managed grazing. Utilization of available forages is below 30 percent of carrying capacity.

Alternatives 2-5 Direct and Indirect Effects

Areas of current and historic sheep grazing would continue in existing vegetation cover for both lowland Headquarters, Henninger, Humphrey and the Summer Range in the Centennials. Ending grazing would allow for more leaf litter available for organic accumulation and recovery of soil function in compacted areas in the long term. The no grazing alternatives would produce no detectible or measurable changes on soils for Headquarters, Humphrey, and East Summer Range since the projected use is near or less than the current 10 percent (Table 39). Soil conditions should improve at Henninger for alternative 2, since use would be discontinued compared to the current 24 percent forage utilization, but recovery would not likely be discernible in the short-term. Alternative 3 would extend grazing through summer months on Headquarters, and boost AUMs used, but the effect is uncertain as no discernible changes are anticipated since utilization of available forages continues at less than 10 percent, and sheep grazed/acre over this large acreage would be insignificant.

Other properties would have reductions in AUMs ranging from 20 to 100 percent. On Humphrey, East Summer Range, and West Summer Range, from which all grazing would be suspended, there would be no further potential direct and indirect effects to soils, and there should be recovery of any areas impacted by historic grazing. Alternative 4 could have some lower recovery potential on the West Summer Range without a rest rotation system, but no discernible changes in effects are projected. However, on the East Summer Range where grazing would be suspended, as noted in alternative 3 above, potential impacts, direct and indirect, would be eliminated as well. Alternative 5, given an overall 40 percent reduction in AUMs, would indicate a decrease in soil disturbance/compaction, and erosion.

Conceptually, where grazing is discontinued on lowlands, plant and soil associations would persist since the arid conditions lend to slow recovery potential. Long-term studies on sheep grazing during the mid-20th century show varied potential for recovery based on current soil potential and vegetation composition (Michunas and Laurenroth 1993, Johnson 2003). State and transition models developed for rangeland integrate these ideas and use indicator species and surface soil conditions to judge not only current condition, but also recovery or trajectory of the plant community (USDA Natural Resource Conservation Service (in review)). Compacted staging areas for animals would stay compacted for the long term given the arid conditions and the relatively infertile environment. In contrast, uplands with species compositions closer to the historic climax communities and with hydrologic regimes intact would have greater regrowth potential. For the ARS properties on the lava plains, Henninger has the highest potential for regrowth with no grazing given the favorable climatic conditions.

The absence of sheep grazing would no doubt improve litter accumulation and retention of biomass. This cover would add mulch and protect soils. Plant composition changes would be difficult to detect after resting given the resilience of the current communities and the closeness to the expected natural habitat for the northern reaches of Headquarters, and especially Humphrey, using the Natural Resource Conservation Service ecological site logic. Again, the differences may be subtle given the current low uses on these lands.

Ending grazing would improve footslope and dry meadow sites at Henninger for alternative 2. Henninger serves as a staging area and has utilization of 24 percent (Table 39). Henninger has higher moisture, deep soils, and lacks the calcareous upper soil layer that can limit plant production. Improvement would be most notable on the footslope sage sites. The predominant species mix of pasture grasses in the lowlands would persist and therefore a higher-level plant community state is not expected, though production could improve. In addition, the altered hydrology from irrigation and deeper entrenchment of Dry Creek has less potential to support historic dry meadow plant species.

Humphrey Ranch has strong semblance to the expected native vegetative community, and, therefore, may show minute improvements except in the willow riparian area. Floodplain soils along this tributary of Beaver Creek would show improvement over the current condition if grazing were terminated, since soils have good functional attributes, albeit with some Canada thistle and upland shrubs. Compaction is rare and the current vegetation suggests good soil through-flow. Given these conditions, recovery potential is high. The collapsed banks would stabilize allowing improved movement of soil moisture outward. In addition, mesic vegetation species adjacent to the stream could establish without sheep grazing facilitating vegetation and soils recovery.

Alternative 4 would condense grazing to the West Summer Range only for the summer and likely not utilize the rest rotation system. Alternatives 2 and 3 eliminate grazing. Alternative 5 decreases grazing proportionally to about 2/3 of current levels. No differences would be detected in the short term for alternatives 2-5. Alternative 4 could potentially generate worse seasonal range conditions with concentrated use in the West Summer Range with more incidental soil damage from trampling and bedding.

Invasive Plants

Ending grazing and active management in alternatives 2-5 would have uncertain impacts for invasive weeds and thus soils productivity. Ending selective sheep grazing and loss of active management could further expand distribution of existing invasives. On the other hand, reduced sheep numbers and associated inputs of fecal matter and disturbance, along with less travel use of road ways decreases opportunities for invasive plants and, thus, impacts to soil productivity.

Herbicide use would decline by 10 acres annually with elimination of the Humphrey Ranch in alternatives 2 and 3 and cease altogether except for the two acres at Headquarters (Table 39). No changes in soil productivity are anticipated with this reduction in use since the sprayed areas are primarily disturbed sites. The tradeoffs are similar to those for the elimination of selective grazing.

Prescribed Burning

Alternatives 3-5 would have similar impacts from prescribed burning to alternative 1, since these alternatives retain Headquarters as primary range. The assumption is the elimination of sheep grazing at Headquarters would eliminate the burning program. For alternative 2, eliminating the burning program reduces the opportunity to maintain the natural 25-40-year fire cycle.

Alternatives 2-5 – Changes on Non-ARS Lands Used by the Sheep Station

Effects from continued grazing and related activities on Non-ARS lands, supporting the mission of Sheep Station, including past, present, and foreseeable future grazing and related actions is not foreseen as detrimental to soil productivity, and/or other functions and values provided by the soil resources in the long-term.

Cumulative Effects

Alternative 1 – Cumulative Effects

ARS Properties

Grazing and associated supporting management activities, as proposed under this alternative, would have little if any additional cumulative effects on soils.

Non ARS –Lands

Since the BLM and USDA Forest Service allotments, and DOE feedlot and allotment used for a winter feedlot and limited grazing (Mud Lake), are not contiguous to one another, or to ARS properties, there are no additive cumulative effects among these various properties.

Furthermore, since utilization of available forages under alternatives 2-5 would be eliminated or reduced for all allotments, with exception of the Mud Lake (DOE) feedlot, where utilization would see a very slight increase of 1 percent compared to alternative 1; soils would remain stable and well suited for grazing, related supporting management activities, and other resource benefits and values. Thus cumulative effects would not occur, so as to be easily discernable, if at all, on non-ARS lands.

Alternatives 2-5 – Cumulative Effects

ARS Properties

Alternative 2. With no grazing, there would be no further or additional cumulative effects.

Alternative 3. Cumulative effects, even with a 3.5 percent increase in forage utilization on Headquarters, would be minimal and the slight risk to soil function and values for soils under this alternative are not easily measured or documented.

Alternative 4. Even with slight increases in forage utilization on the Henninger Ranch property (0.8 percent) and East Summer Range (2.1 percent), cumulative effects would be minimal and not easily measured or documented. Soils would remain stable for all properties, except for a slight downward trend for the Henninger property under alternatives 3 and 4.

Alternative 5. With grazing reduced by 30 to 40 percent, no cumulative effects would occur.

Non ARS –Lands

Because utilization of available forages under alternatives 2-5 would be eliminated or reduced for all allotments, with exception of the Mud Lake (DOE) feedlot, where grazing utilization would see a very slight increase of 1 percent compared to alternative 1, adverse soil effects to productive potential would be slight, and likely not measurable; retaining fair-good suitability for long-term grazing use as planned. No cumulative effects are anticipated.

Summary of Cumulative Effects

Adverse cumulative effects are not expected for any of the alternatives. Effects from wildfire and prescribed burning are not degrading soil productivity.

The additive effects of past grazing are considered more in detail within the context of the current plant community and soil condition (see Affected Environment and Direct Effects sections). Over the last 86 years, grazing management appears relatively consistent with possibly upward trends in the last twenty years from reduced grazing and rest rotation in the uplands along with evolving grazing practices.

Historic wildfire could continue to affect soil productivity on ARS properties on the Summer Range. Wildfire effects from the early 1900s remain visible in the East Summer Range, with old erosion gullies still observed on the north side of Toms Creek divide. This is indicative of the low productive soils forming from interbedded dolomitic limestone and shale on steep slopes. Elsewhere, evidence of old wildfires is not visible, and soils are stable and vegetation robust. Recent fire on the Meyers Creek allotment shows quick recovery.

Prescribed fire is limited to the Headquarters Property where ongoing efforts continue. Roughly 19,000 acres have burned since 1936. About 70 percent of this is from wildfire, though a more active burning program has been in place over the past 10 years; with prescribed burning averaging 600 acres per year. The Sheep Station would like to increase this to 900 acres per year to approximate a natural 30-year fire-return interval. Positive effects occur where fire is returned to the system through nutrient influx. Adverse effects occur where cheatgrass increases.

Irreversible and Irretrievable Commitment of Soil Resources

There are no irreversible commitments of soil resources on ARS properties, under all alternatives considered; where potential soil productivity/full function has been destroyed or would only be recoverable over extremely long periods. There are areas where productive potentials are considered irretrievable, where soils have been committed to, or restricted for other uses (e.g. annually maintained firebreaks, roads, sheep driveways). This represents a management decision to restrict use and management of those properties for other purposes, but those decisions/actions are not irreversible. They represent a commitment of soil resources necessary to support the overall research mission established by executive order and public law for the Sheep Station, through use and management as proposed in each alternative. Potential impacts to soil productivity have been recognized, but those impacts are not irreversible; impacted soils can be managed and/or restored to achieve full benefits, functions and values.

Hydrology

For additional details of the hydrologic affected environment see the Hydrology Report located in the planning record.

Hydrologic Affected Environment

Table 41 summarizes the watersheds involved with the project by property.

Table 41. Summary of watersheds involved with the project by grazing property

Property	Watershed Involved with Allotment by Number	Property	Watershed Involved with Allotment by Number
Headquarters	170402140101 170402140401 170402140501	West Summer Range (Odell Creek/Big Mountain)	170402140606 170402140607 100200012101 100200012102 170402020801 170402020802
Humphrey	170402140404 170402140405	Snakey-Kelly	170402140601 170402150401
Henninger	170402140607	East Beaver	170402140404 170402140405 170402140406 170402140407 170402140408 170402140603
East Summer Range (Toms Creek)	100200012101 100200012201 100200012202 170402020803	Meyers Creek	100200012101 170402020803

Figure 47 displays the ARS properties within the project area and the associated 6th order watersheds.

Hydrology

Stream gauge stations, operated by the U.S. Geological Survey (USGS 2008) were maintained for various periods of record on Beaver Creek near the Headquarters property, on Odell Creek and Toms Creek near Lakeview Montana. Beaver Creek is typical of streams in flood basalt geology and its description below is illustrative of the runoff hydrology of the lower elevation properties of the Headquarters, Henninger, and Humphrey properties. Odell and Toms Creeks flow from the Montana side of the Summer Range in the Centennial Mountains and the gauging information is similarly useful in describing the hydrology of that area.

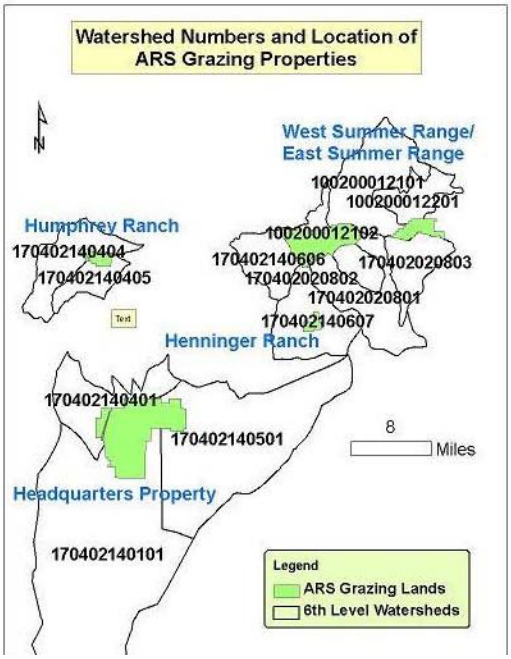

Figure 47. Locations of watersheds involved with ARS properties

Peak flows in watersheds influenced by the Centennial Mountains are during late spring snowmelt, usually during May and June for all three gauges. Toms Creek only operated May through September 1989, although it was dry at the station site July through September. Beaver Creek is perennial throughout its period of record from April through June. During drought years, it may be dry at the station site July through March, only running with snowmelt runoff. During wet years, the stream flows year round at the gauge site.

Odell Creek did not operate through the winter months possibly due to freezing conditions; whether there was flow is not known. Otherwise, gauge records show consistent flow spring through fall during all the years of record.

On the Idaho side of the continental divide, the drainage in the Headquarters and Henninger Ranch properties is imprinted with a degree of disorder, with many small depressions that are possibly the result of partial collapse of tubes or blister cones within the flow, and other small basins created between ridges. The deep and regular fracturing, or joint sets, that is frequent in basalts provides excellent downward percolation of precipitation water, and a potentially high volume of storage, very often creating the so called “dry mountain” effect: a terrain with marked absence or low density of drainage features, a complete lack of surface scour channels, and underdeveloped low order valley form. The regular jointing is caused by shrinkage of the flow due to slow and relatively uniform cooling, and is analogous to shrink cracks in clay. Throughout these two properties, the exposed top surface of flows, usually on very broad, shallow ridges clearly shows well developed hexagonal joint patterns that likely persist deep into the rock of an individual flow layer.

Within the Humphrey Ranch property, the subdued topographic relief does not generate enough water-yield to sustain perennial flow in the smaller tributaries to Beaver Creek. These tributaries are ephemeral or have surface water expressed during base flow periods, where there are poorly drained relatively impermeable soils in the valley bottoms. Long Creek and Beaver Creek are probably both perennial based on 2008 field observations.

The Summer Range is divided between bedded sedimentary rock and felsic extrusive igneous mostly either rhyolites or trachytes. Fracturing in the felsic igneous is considerably less regular than that for thick basalt flows. In any case stream flow yield from the ridges of extrusive igneous in the upper portion of the Odell and east side of the Toms Creek grazing units, is evidently high and more analogous to granitic slopes, which because of poor transmissivity of the rock (volume of water that can move through it), and typical steepness, are “wet” slopes. Precipitation water does not percolate far into relatively un-weathered rock under the soil mantle, but instead travels down slope as shallow subsurface interflow in the soil to daylight frequently at major breaks in slope or geologic facies into springs and boggy seeps. In addition, the large mass of slump material filling the topographic lows of these properties may provide storage area for release during the summer baseflow. The slump slopes in the other properties have much less displacement and have not collected in such quantity in the steeper and narrow valleys.

The Spring Creek drainage network is ephemeral to intermittent in nature. A single unnamed first order draw provides the only surface flow during summer base flow season to the main stem, which is insufficient to charge the valley fill. By contrast, the Odell Creek drainage system contains abundant surface flow throughout the property. There is a clear correlation between fault lines and stream valley alignment (including the perennial tributary to Spring Creek). Un-mapped but inferred faults in the lower reach of Spring Creek act as barrier to flow with surface flow ceasing at a possible intersection of a fault.

Channel, Riparian and Floodplain Conditions

Proper functioning condition (PFC) surveys were used to evaluate riparian and stream channel conditions on streams that were visited in 2008 and 2009 (USDI et al. 1998). A total 20 sites were surveyed. Seventeen sites were rated to be in proper functioning condition, and three received ratings of functional-at-risk. This information is summarized below in Table 42. Additional discussion about these surveys is found under each grazing area.

Riparian vegetation, where present, was noted to have diversity of species and age groups, and was in good condition. Detail that is more specific is noted under each grazing area.

Table 42. Summary of proper functioning condition surveys conducted on ARS Sheep Station properties

Property/Grazing Area	Point ID	Rating	Comments
Big Mountain Grazing Unit	BM1	FAR	Stream eroding into road prism at Spring Creek
	BM3	PFC	A3 channel type
	BM4	PFC	A2 channel type
West Odell Grazing Unit	OD2	PFC	B3 channel type
	OD4	PFC	B3 channel type; North Fork Toms Creek
	OD5	PFC	A/B4 channel type
	OD7	PFC	B3 channel type
	OD8	PFC	C3 channel type
	OD15	PFC	E4 channel type
Toms Creek Grazing Unit	Pt M	PFC	Corral Ck; A3/A4
	Pt G	PFC	Stream near Blair Lake (below stream crossing)
	Pt J	PFC	A4
Humphrey Ranch	H15	FAR	Ditch-Modoc Creek/Berry Creek
	H14	PFC	E3 channel type
	H2	PFC	E3/34 channel type
	JF2	PFC	E3/34 channel type
	H1	PFC	E3/34 channel type
	JFPT 3	PFC	G4/5 channel type-middle portion of stream at lower end of PFC
Henninger Ranch	HEN8	FAR	F4 channel type; Alteration of flow, rip-rapping, irrigation; Dry Creek
	HEN1	FAR	C4 channel type; Alteration of flow; rip-rapping; Moose Creek
Headquarters	No Surface Flowing Drainages		
DOE Feedlot	No Data Taken-Industrial Area		

Overall, channel conditions are good to excellent on ARS properties, with the exceptions noted above in Table 42. Good and excellent are defined are as meaning that bank stability, fine grained sediment (sand size and smaller), apparent water clarity and channel morphology and pattern are within expected and acceptable limits for a given channel type. This means that the given flow regime, valley slope and slope delivery mechanism for sediment to valley bottoms are appropriate for the channel type at each surveyed location.

Exceptions were noted at one location on Spring Creek (Big Mountain grazing area), at the point of diversion just past the confluence of Berry and Modoc Creeks on the Humphrey Ranch and at Henninger Ranch on Moose and Dry Creeks.

Diversion has occurred on all four streams for irrigation purposes and at Berry and Modoc Creeks diversion appears to have been used in order to route only one channel under the Interstate. Diversion has resulted in alteration of floodplain and channel function for all four channels, and on Modoc Creek, small levee type features were on either side of the channel/ditch.

Springs and Wetlands

No springs were observed during field work in 2008 and 2009.

Field reconnaissance was conducted during the summer 2008 and 2009. Based on field observations water-influenced soils were only found associated with flowing streams or at Blair Lake. The width of water-influence appeared to be limited and often reflected by the presence of *Salix* spp. and *Equisetum fluviatile*.

Wet meadow conditions were observed in the Humphrey Ranch adjacent to Beaver Creek and in several swale areas on the Ranch. These low-lying areas lacked developed channel morphology, but appeared to have seasonally wet conditions or have wet conditions that were sustained after periods of precipitation.

Water-influenced soils around Blair Lake were observed to have limited trampling and compaction. These areas were limited to driveway crossings and areas around Blair Lake where sheep access the water for drinking. At driveway crossings and around Blair Lake adjacent vegetation and water-influenced soils did not appear to be disturbed or otherwise compromised.

No bedding areas were observed in areas of water-influenced soils. These field observations support information provided by Sheep Station personnel that sheep prefer to congregate on slopes and ridge tops and avoid wetland and riparian areas.

Water Quality

303(d)/305(b) Report

The Clean Water Act (CWA), of 1972, and subsequent amendments of 1977 and 1987, is the primary federal law that governs water pollution in the United States. Under the act states are required to set water quality criteria standards. A biennial report, under section 305(b), is prepared for congress by the states and Environmental Protection Agency. Within that report a list of impaired water bodies within the state (section 303(d) of the CWA) is required.

Since the project area includes parts of Montana and Idaho both States integrated reports for 303(d) and 305(b) information was reviewed. Water quality criteria and standards for both States are tiered to designated beneficial uses. For the State of Idaho these are: aquatic life, recreation, domestic water supply, wildlife habitat and aesthetics (State of Idaho 2009). The State of Montana's designated beneficial uses are public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation and other beneficial uses (State of Montana 2006a). The State of Montana defines impaired as "a water body or stream segment for which sufficient credible data shows that the water body or stream segment is failing to achieve compliance with applicable water quality standards" (http://data.opi.mt.gov/bills/mca/75/5/75-5-103.htm).

Waters in the integrated 303(d)/305(b) reports are classified by category, denoting their compliance with applicable water quality standards. The relevant categories for this analysis are 4a, 4c and 5 (Table 43). Category 4a waters do not support a standard for one or more designate uses, but a Total Maximum Daily Load (TMDL) is not needed. A Total Maximum Daily Load is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards (http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/index.cfm). Category 4a waters mean that the TMDL has been calculated and approved by EPA. Category 4c indicates that that non-support of water quality standard(s) is not due to a pollutant. Category 5 streams are defined as "waters where one or more applicable beneficial uses are impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat." These waters make up the 303(d) list for a state (State of Montana

2010). Each state proposes which reaches would have TMDLs developed and the year to be completed. The hydrology specialist's report in the planning record includes additional detail regarding water quality standards and classification.

Table 43. 303(d) integrated reporting categories found in the project area

Category	Description
Category 4a	A State developed TMDL has been approved by EPA or a TMDL has been established by EPA for any segment-pollutant combination.
Category 4c	The non-attainment of any applicable water quality standard for the segment is the result of pollution and is not caused by a pollutant.
Category 5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

Source: http://water.epa.gov/learn/training/standardsacademy/page7.cfm

The 2008 State of Idaho Integrated 303(d)/305(b) report, and accompanying GIS data, document that 10.4 miles of stream flowing through ARS properties are categorized as 4a. A TMDL for temperature has been developed and approved by EPA for Beaver Creek but not implemented; and Beaver Creek is still considered impaired. Figure 50 displays the location of these streams (State of Idaho 2009). Fieldwork in 2008 conducted three proper functioning condition surveys on Beaver Creek, where it flowed through ARS properties. Two of the surveys found the stream in proper functioning condition with abundant riparian vegetation and no signs of upland disturbance. At the third site, a rating of functional-at-risk was given due to the immediate adjacency of an old inactive gravel pit and a road crossing the stream.

On the Humphrey Ranch, surveyed sections of Beaver Creek and Long Creek did not show evidence of flow, physical substrate, and habitat alterations during the 2008 and 2009 field seasons. Fieldwork along Beaver and Long Creeks did not provide indications of past riparian harvest or removal. As a result, water temperature alterations may be due to flow alterations. It should be noted that Beaver Creek is listed by the State of Idaho as impaired although proper functioning condition surveys conducted on Humphrey Ranch rated the stream as in proper functioning condition. Analysis of the State of Montana's draft 2010 Water Quality Integrated Report (303(d)/305(b) list) shows three streams originating in the Centennial Mountains on the 303(d) list or listed as impaired, but not requiring a TMDL. Corral Creek, Odell Creek, and Tom Creek are listed as Category 5 streams (State of Montana 2010). Hell Roaring Creek is listed as a category 4C. The location of these streams is displayed in Figure 49. Although Corral, Odell and Tom Creeks have been listed as requiring TMDLs, and a date has been assigned for TMDL completion, none of these TMDLs have been developed as of yet (State of Montana 2010, Appendices B and F).

Although these streams are listed from headwaters to steam mouths, the listings appear to be based on problems specific to certain reaches lower in the Red Rock Lakes basin, which are not located on ARS properties. Discussions with the State of Montana indicated that the listing of the entire reach appears to be more a matter of convenience than impairment (Fryxell 2011a).

The State of Montana 2008-2010 integrated report describes the upper reaches of Corral and Hell Roaring Creeks, whose headwaters are in the Toms Creek grazing unit of the Summer Range, as in excellent condition (State of Montana 2010). Field observations in July 2008 and August 2009 support these conclusions (Moser and Fryxell 2008, Fryxell 2009). Further communications with the State of Montana document conditions in these two drainages. The upper reach of Hell Roaring Creek is documented as in near pristine/reference condition and the upper reach of Corral Creek is a mountain stream with good cool flow, stable stream banks, good riparian vegetation and shading and clean substrate (Fryxell 2011b).

In both areas, vegetation appeared consistent and well established, in the areas that were visited. There were no major areas of upland instability or erosion observed in these field trips that could be potential sources of sediment. No areas of excessive riparian impacts and browse were observed that could be construed as alteration of riparian vegetative cover (Moser and Fryxell 2008, Fryxell 2009).

The entire length of Odell Creek is listed, due to impairments which were the result of severe erosion from grazing in riparian areas and dewatering due to irrigation (State of Montana 2006d). The last time this reach was assessed was 1999.The report is not specific to where these problems are located and neither of these issues was observed during field work conducted in 2008 on ARS property in this area. In addition, during field work vegetation appeared consistent and well established in the areas that were visited. There were no major areas of upland instability or erosion observed in these field trips that could be potential sources of sediment. No areas of excessive riparian impacts and browse were observed that could be construed as alteration of riparian vegetative cover.

No areas of streambank degradation were noted except at two minor areas on Odell Creek (OD4 and 5, Moser and Fryxell 2008).

A similar situation exists with Tom Creek. Probable causes of impairment are grazing in riparian or shoreline zones and irrigated crop production (Montana 2009, 2006e). No grazing related sources of sediment and siltation, alterations to flow or to stream side vegetation were observed during the field seasons of 2008 or 2009 in the headwaters of Tom Creek (Moser and Fryxell 2008 and Fryxell 2009). However, the map for this reach indicates that the entire listed segment does not extend beyond the valley floor, in front of the north boundary of the Centennials (Figure 53).

In Montana, there is only one impaired waterbody within the project area. Upper Red Rock Lakes is listed as impaired due to other flow regime alterations and sedimentation and siltation. These problems are due to agriculture, grazing in the riparian or shoreline zones, range land grazing and upland sources (State of Montana 2010, appendix A, Figure 48). Examination of maps associated with Red Rock Lake on the Montana Dept. of Quality Clean Water Information Center Mapper shows that both the Upper and Lower Red Rock Lake areas do not involve ARS properties (http://cwaic.mt.gov/query.aspx). In Idaho there are numerous waterbodies present but they have not been assessed (Figure 49).

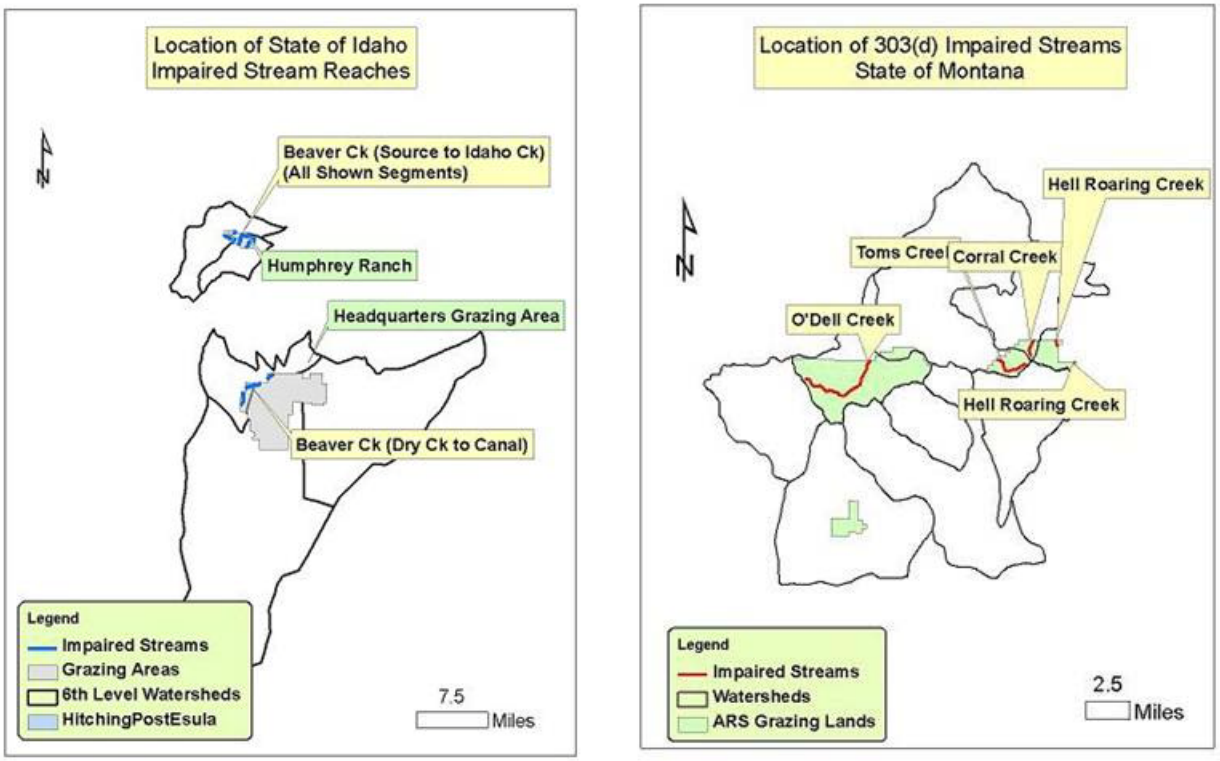

Figure 48. Location of Idaho and Montana 2008 303(d) Impaired Streams Found on ARS Properties

All streams, and water bodies, which are not impaired in both Idaho and Montana, are displayed in Figure 50. Impaired streams are included as reference markers, as are the differing grazing allotments.

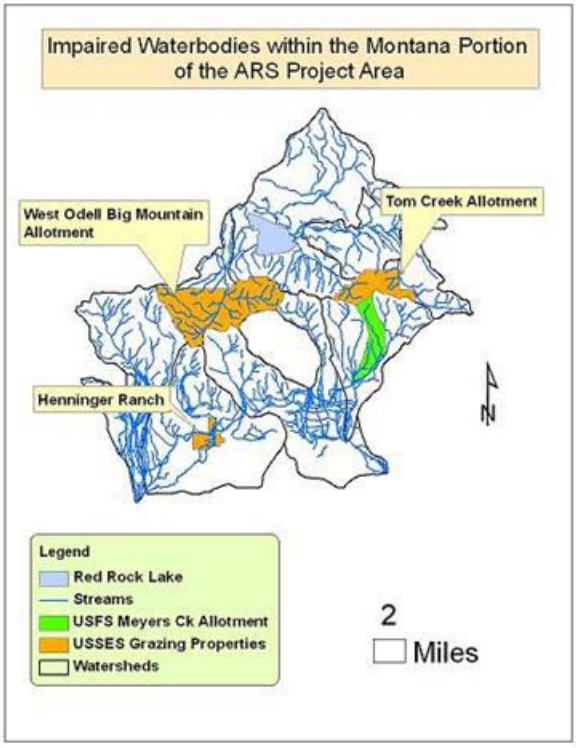

Figure 49. Locations of impaired waterbodies in the Montana portion of the proposed project area

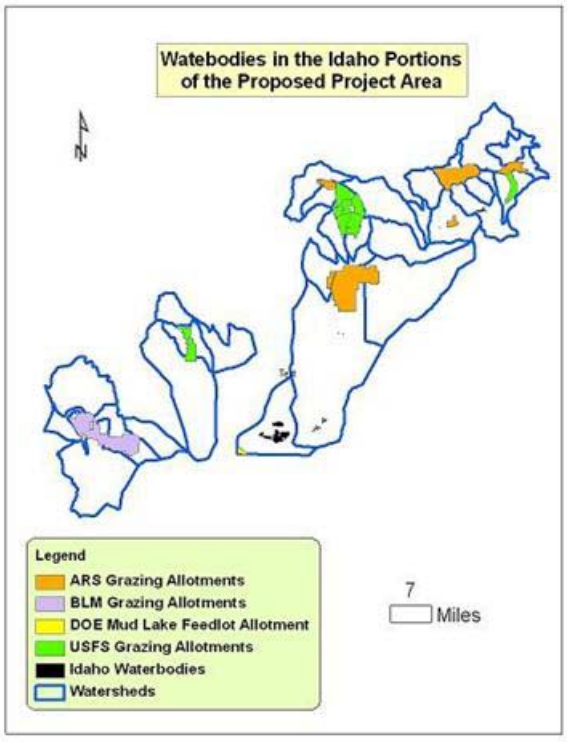

Figure 50. Locations of waterbodies in the Idaho portion of the proposed project area

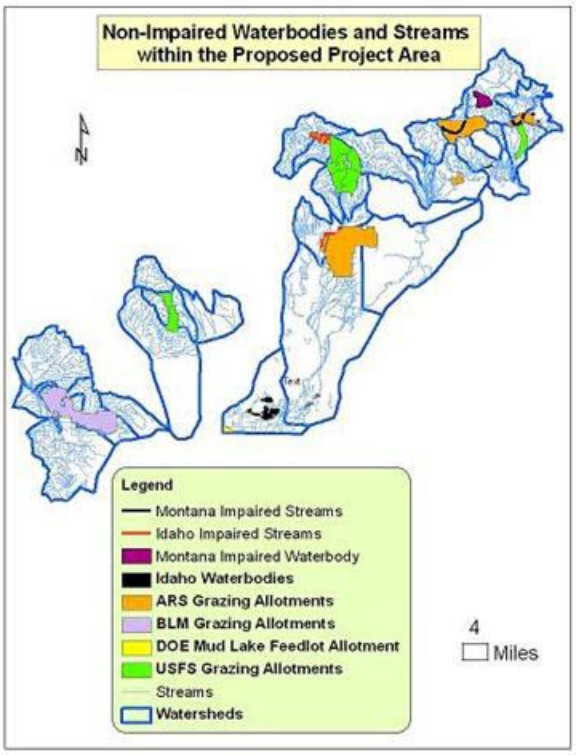

Figure 51. Locations of non-impaired streams and waterbodies in Montana and Idaho within the project area

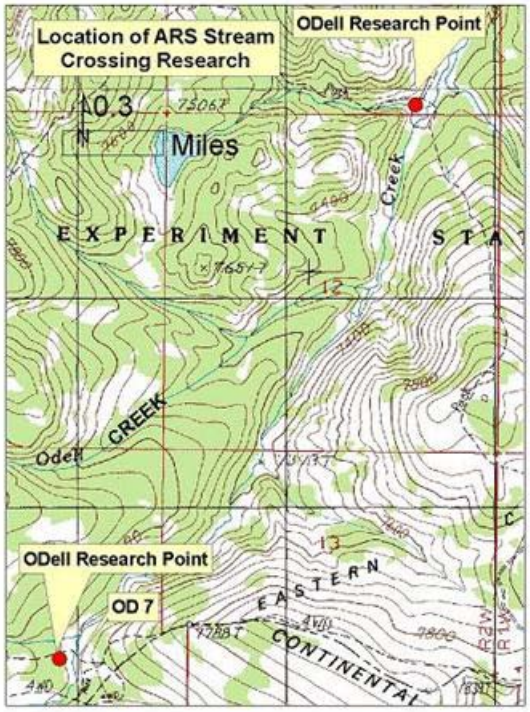

Figure 52. Location of Odell Creek Sheep Station stream crossing research points (OD 7 ties to Figure 60)

In 2005 and 2006, a study was conducted on two reaches located on Odell Creek by Sheep Station researchers (Lewis et al. 2009). A total of 2,000 to 2,500 sheep were crossed each year. The objective of the study was to determine effects of sheep crossing Odell creek on suspended sediment and generic *Escherichia coli* (E. coli). Water samples were collected every two minutes at a point 25 meters above the crossing and at 25, 100, 500 and 1, 500 meters below of the crossing. Samples collected above the 25 meter upstream collection point represents background concentrations for both sediment and E. coli in Odell Creek.

The results of the data collection show that for both suspended sediment and E. coli concentrations, effects diminish rapidly with distance downstream, and duration of elevated water quality analytes is short-lived. See the Hydrology Report located in the project record for a more comprehensive discussion of this study.

Figure 53. Location of the impaired reach on Toms Creek

Herbicide Applications

Invasive plants are present and have been addressed through targeted select grazing and localized herbicide use. Herbicides are used to kill or inhibit the growth of invasive undesirable or exotic broadleaf weeds and/or woody plants.

Herbicides have been used along roads, buildings, feedlots and corrals for the past thirty years following manufacturer's directions. No herbicides are applied on rangelands. Herbicides that are used include: clopyralid, triclopyr amine, Imazapyr, Diuron, Picloram, Bromacil, non-aquatic Glyphosate, 2, 4-D amine. Application methods are spot application, hand wand application to control weeds along roadsides, in dry-lots and corrals and near building structures. Four-wheeler-mounted and tractor-mounted boom-sprayer applications are done in small pastures and large dry lots (USDA ARS, Appendix C 2008).

In 2009 a total of 59 acres were treated. Thirty-five acres on the Headquarters property were treated with Curtail that is a combination of Clopyralid and 2, 4 D, and another 10 acres were treated on Humphrey Ranch. Two acres associated with feedlots were treated with Krovar, which is a combination of Bromacil and Diuron. Targeted species included spotted knapweed, downy brome, and leafy spurge.

Review of available GIS layers, obtained from the Sheep Station, documenting weed locations, show that herbicides have been applied adjacent to Beaver Creek on the west side of the Headquarters Property and along several intermittent tributaries. Applications are according to product directions and adhere to directions in the material safety data sheets. Herbicide application requirements are defined in appendix C of the EIS and under Best Management Practices (38).

Municipal Watersheds

There are two wells located on the Headquarters property. One well, developed in 1918, is estimated to be at least 350 feet deep. The other well, developed in 1937, is 856 feet deep with the water level at 731 feet.

These wells are used for drinking water and are tested quarterly for the presence/absence of coliform and are tested annually for copper and lead. Volatile organic compounds and arsenic are monitored once every three years. Inorganic compounds and nitrite are required to be monitored every nine years. Nitrates are required to be monitored annually. Synthetic organics (herbicides) are required to be monitored every six years. Out of the three compounds known for groundwater contamination, only Picloram is monitored, apparently Bromacil and Diuron are not regulated in Idaho (Feisthamel 2009). Exceedances above maximum contaminant levels are rare, with only one exceedance of MCLs in 2005 for coliform. There have been no detections of Picloram (Feisthamel 2009).

There is also a domestic well on the Henninger Ranch, but that well is not used and is not monitored (Jacobson 2009b, Yurczyk 2009b).

Watershed Characteristics and Conditions

In general, alluvial flats found on lower basin floors are dominated by sagebrush and underlying basalt flows. Areas underlain by basalt flows lack defined drainages due to the basalts high permeability and porosity. Adjacent lower elevation flatlands are very well drained and have moderate grassland productivity (Figure 54).Road densities by 6th level watershed are summarized in Table 45. These are all the watersheds involved in the proposed action. Table 45 summarizes the miles of road within 300 feet of streams on the Headquarters property. There are 2.7 miles of existing firebreak around the Headquarters buildings. The firebreak is roughly 20 feet wide and is comprised of mineral soil. The total area of the firebreak is 65 acres. No streams, springs, or wetlands are adjacent to the firebreak.

Figure 54. Views of typical alluvial flats underlain by basalt, Headquarters Property

Table 44. Summary of road miles within 300 feet of streams

Headquarters Area	
Road Surface Type	**Miles of Road**
Native Surface	5.4
Gravel	3.0
Paved	0.2

The Summer Range has complex stream networks that dissect the rolling ridges of the Centennial Mountains, and is characterized by relatively high productivity with intermixed grass-forb lands, sagebrush, and conifers

The 6th level watersheds, and associated grazing properties and allotments, are summarized below in Table 46.

Sheep bedding areas are found in all the grazing areas used by the Sheep Station. Traditional bed-grounds are defined only for the West Odell and Big Mountain grazing units. However, each defined bed is not used annually. The total area used is less than one percent for Big Mountain and West Odell grazing units in Figure 54.

Beds have not been mapped with GPS for the other ARS properties. Herders try to use different sites every night, which minimizes compaction, trampling, and loss of vegetative cover. A study by Moffet (2009), studied the hydrologic effects of sheep beds on subalpine ranges. It was determined runoff and erosion is more likely on bed grounds after use, but only under extreme rainfall conditions.

In the area, a 100-year, six-hour precipitation event is around 1.9 inches per hour; however to ensure capturing runoff generation the study simulated rainfall at 6.2 inches per hour. For a 30-minute rainfall event at 6.2 inches per hour, the study found erosion increased approximately ten times. Field observations made in 2008 and 2009 at various bedding areas noted no rilling, gully development, or upland-associated sediment transport with these bed areas. As a result, it was determined these areas do not affect watershed condition and are not functioning as sources of erosion and sediment transport.

Table 45. Summary of road densities in all watersheds involved in the proposed action

Watershed	Road Density	Watershed	Road Density
100200012101	0.3	170402140603	1.4
100200012102	0.2	170402140604	1.7
100200012201	0.7	170402140606	0.8
100200012202	0.2	170402140607	1.7
170402020801	1.3	170402150104	1.6
170402020803	1.3	170402150301	3.3
170402140101	2.3	170402150401	1.4
170402140401	1.8	170402150402	0.6
170402140404	0.7	170402160101	0.1
170402140405	1.2	170402160601	1.1
170402140406	1.3	170402170101	0.8
170402140407	2.4	170402170301	0.2
170402140408	1.5	170402170302	0.2
170402140501	2.5	170402171101	0.2

Table 46. Summary of observed surface conditions by ARS properties and grazing units

Property/Grazing Unit	Watersheds Where GPS Points were Taken	Number of Points Taken	Range of Surface Conditions	Range of Percent Total Cover/ Average
Big Mountain	100200012102 170402020802	3	2-4	0-80/43
Odell	100200012102	12	2-4	0-100/64
Toms Creek	100200012101 100200012201 10200012202	9	1-4	0-95/64
Humphrey Ranch	170402140404 170402140405	23	1-4	25-100/89
Henninger Ranch	170402140607	10	2-3	0-95/75.5
Headquarters	170402140101 170402140501	128	1-4	0-100/73.4
DOE Feedlot	No Data Taken-Industrial Area			

Big Mountain Grazing Unit (West Summer Range)

Watershed condition generally appeared consistent throughout this grazing area, based on the ride-through in 2008. Three data points were taken, as the area was very consistent in appearance. Uplands were generally well vegetated with little evidence of surface runoff or erosion (Figure 55). No evidence of desertification was observed in the field. Desertification occurs when the amount of dry-land biological productivity is reduced. There are several reasons why desertification occurs, and grazing can be one of them, or there can be several factors causing this to occur (http://www.britannica.com/EBchedked/topic/159114/desertification). Two locations received a rating of proper functioning condition and one location received a rating of functional-at-risk. See the "Channel and Floodplain Conditions" section, Page 181.

Bare soils were primarily associated with steep southwest facing ridges and were largely due to active slip faces. These slumps start with a convex shape, and then evolve into a concave shape, where they appear to stabilize and re-vegetate. No evidence such as trailing, trampling, or bed grounds was noted in association with these slumps. As a result, these areas of disturbance are considered "natural" and not related to grazing activities. Bare ground was also noted in association with bed grounds (Figure 56). However, these areas were very limited spatially in extent. The main bedding area observed had a surface condition rating of two, with soil hydrology and nutrient cycling rated as fair.

Two and one half miles of driveway are found within the West Summer Range. None of the portions of driveway in the Big Mountain grazing unit were found to be sources of sediment.

An old road leading to the J.R. Simplot mine is located in the bottom of the Spring Creek drainage. The road is confining the drainage in

Figure 55. Views of uplands, Big Mountain Grazing Unit (Western Summer Range)

Figure 56. Edge of bedground, Big Mountain Grazing Area, view to northwest

Figure 57. Revegetated roadbed leading to closed phosphate mine, bottom of Spring Creek drainage

places, leading to increased downcutting and channel confinement. Erosion of the road prism was observed in several places. However, the road surface is generally well vegetated, filtering sediment.

Very little evidence of surface runoff and erosion related to the road surface was noted (Figure 57). Road reclamation activities, such as culvert removal, were conducted in 1997 (USDA ARS 2009).

Figure 58 View of vegetation growth adjacent to water trough

In total, there are five water developments within this grazing area. Springs have been developed with permanent troughs, to provide water for ewes and lambs in low-flow areas. Wildlife is known to use these water developments. It is estimated that there is ¼ acre, or less of disturbance per trough (Smith and Yurczyk 2008). Several developed water sources were inspected during the 2008 field seasons. All appeared to be sprouting healthy vegetation covers. This portion of the grazing area had been rested in 2007. Vegetative recovery appeared to be consistent around these water developments, indicating that detrimental compaction and degradation of soil hydrology has not occurred to the extent that it impairs vegetative growth (Figure 58).

West Odell Grazing Unit (West Summer Range)

Watershed conditions appeared to be good and consistent within the West Odell grazing unit. No evidence of desertification was observed in the field. Twelve GPS points were taken throughout the grazing area. Although soil surface conditions varied from a “2” to a “4,” the average was 3.6 indicating fully hydrologic function and almost minimal signs of impairment (Table 46). No evidence of rilling and gully, or other signs of surface overland flow were noted on uplands. Six proper functioning condition surveys were conducted and all received ratings of proper functioning condition.

Figure 59. West Odell Grazing Unit (West Summer Range) looking to the northeast

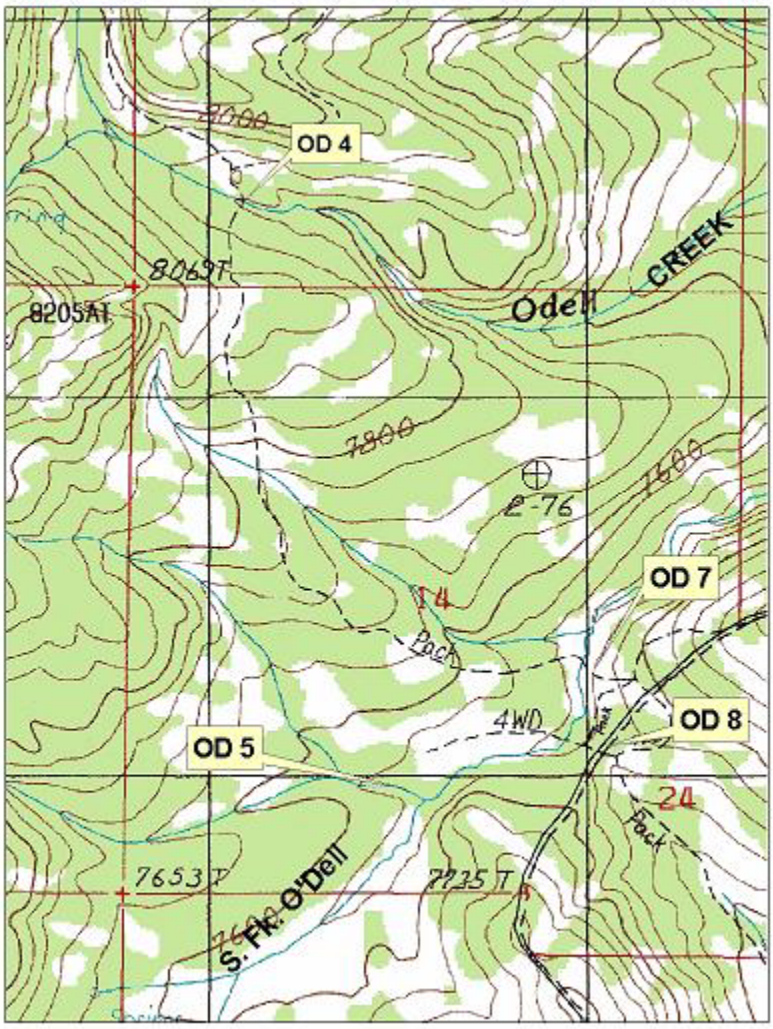

Figure 60. Locations of field observation points OD 4, OD5, OD 7 and OD 89

Slumping and earth flows related to the Cretaceous geology were noted. As in the Big Mountain grazing unit, grazing activities were not observed to have initiated or enhanced the movement of these features.

The West Summer Range contains 2.5 miles of driveways. Within the West Odell grazing unit, four stream crossings, associated with these driveways, were evaluated (Figure 60). At all four crossings streams were observed to be in proper functioning condition. No evidence was observed indicating that stream morphology has been impacted, in any significant way, up or downstream of the crossings. There were no overt indications or evidence of excessive sediment within the associated channels. In addition, there was no indication of heavy or unusual browsing on associated riparian vegetation.

OD 4 is located in SW ¼, Section 11 T15S R2W, and is the major crossing of the four within the West Odell grazing unit. A secondary crossing lies nearby to the west. At the main crossing bare ground was associated with this driveway (Figure 61). Although soil stability, hydrology, and nutrient cycling were rated as impaired in this area, active erosion features were noted only on the far side of the crossing. Rilling and incipient gullying were noted and were adjacent to, and perpendicular to the stream crossing. Minor bank hardening was also noted. Although some extra sediment was being derived from this driveway, no detrimental bimodal distribution of sediment was observed in the streambed.

As a result, it does not appear that sediment contributions are exceeding natural sediment loads being carried by this stream. In addition, bank degradation was confined to where the driveway crosses Odell Creek.

At the secondary crossing, the trail was becoming trench-like and confined.

The other three crossings are located to the southeast of OD 4, in the SE ¼ of Section 14, T15S, and R2W. Each of these three sites involves the South Fork of Odell Creek. Disturbance at these three crossings were confined to the crossings proper and vegetation immediately adjacent was in good condition.

Figure 61. Sheep driveway crossing at Odell Creek, upstream to readers right

At OD5, the entry into the stream crossing was an estimated five feet wide with the exit onto a steeper slopped, which was largely bare of vegetation, and somewhat compacted. There were no well-developed rills or gullies leading down to the creek (Figure 62, Figure 63). Substrate in the stream bottom appeared not to be dominated by fines, with sub-angular siltstones to cobbles predominating. There did not appear to be a bi-modal sediment distribution.

Figure 62. Entry to sheep driveway, OD 5

Figure 63. Close up of exit of sheep driveway, OD 5

At OD 7, minor bank degradation was present at the two stream crossing areas, with one of the crossing exhibiting revegetation. Minor sediment contributions to the stream are derived from these trampled areas. However, there were no rills or gullies observed and there was no observable bimodal sediment distribution of stream substrate, which would indicate an unusually high percentage of fines for this mountain stream. Adjacent uplands were in good health with a well-distributed groundcover of broadleaf

forbs and grasses (Figure 64). The driveway crossing at OD 8 was in good shape and had not been recently used and no rilling or gullies on adjacent uplands were noted.

Toms Creek Grazing Unit (East Summer Range)

Toms Creek grazing unit comprises the East Summer Range (Figure 66). During the summer of 2008, this grazing unit was reviewed for existing conditions. Proper functioning condition surveys were conducted at three locations; all received ratings of proper functioning condition.

Figure 64. Views of uplands in Toms Creek Grazing Area

No evidence of desertification was observed in the field. Uplands were remarkably consistent in vegetative cover. No sources of upland erosion, consisting of rills and gullies were noted. Some evidence of overland flow was noted in association with melting snow fields and was confined to within 50 feet of these areas, and no erosional features were noted in association with the melt water. Earth-flows and slumps were occasionally present, associated with unstable stratigraphic layers.

One area of uplands was of special interest, which is located at the head of the North Fork of Toms Creek, and has been an area of past debate (Figure 66, Figure 65). This area burned in a forest fire sometime between 1880 and 1930. Burned trees still stand and charcoal is still found in upper portions of the soil horizon. Slopes tend to be steep (over 10 percent) with poor site productivity (Jacobson 2009a). There has been debate regarding supposed over-grazing practices by the Sheep Station. This area was surveyed with Sheep Station, Soil Conservation Service and University of Idaho personnel to review upland conditions. Sheep Station notes on the meeting state: “Soil Conservation personnel believe grazing abuse by the Sheep Station had not occurred, that the site was as good as could be expected, that no current erosion was occurring, and the overall trend was up” (Jacobson 2009a).

Figure 65. View looking west to area underlain by Park Shale, west half of North Fork of Toms Creek

In 2009 field work was conducted again to assess this area (Fryxell 2009). The eastern portion of this headwater supports a consistent vegetative cover, which is being re-established after both historic and Sheep Station grazing. Relict trailing was noted, but trails are re-vegetating throughout this portion of the headwaters (Fryxell 2009, Figure 66). This area is designated as Unit 8 Toms Creek grazing area (Eastern Summer Range) and has had only incidental grazing since 1994 (Jacobson 2009, Moffet 2009). The 2009 field inspection revealed no evidence of rilling or gullies, but there was evidence of naturally occurring soil creep, as indicated by trees and snags leaning into the

hillslope. Soils are stony and provide a notable measure of cover. This portion of the headwaters is underlain by the Cambrian Bighorn Dolomite.

Figure 66. Vegetation and recovery of trailing, east portion, North Fork Toms Creek (Bighorn Dolomite Area)

To the south, an abrupt and dramatic change in vegetative cover was observed, as vegetation becomes largely absent on the uppermost and steepest portions of the western half of these headwaters (Figure 67). On the lower portions of this area, where slope gradients are shallow vegetative cover becomes consistent and lush. Trees are sporadic in both the northern and southern portions of these headwaters due to poor site productivity. Even though cover is largely lacking there was no observed evidence of overland surface flow, rills, gullies or mass movement. To the north and west additional trailing was noticed, but as mentioned above these areas are now green due to revegetation. The North Fork of Tom Creek appears to be ephemeral to intermittent. Channel definition increased in a downstream direction, reflecting increased flow volumes. The channel was classified as a Rosgen A3[15], characterized as a steep, entrenched, cascading, step pool stream, in proper functioning condition. Uplands were not observed to be eroding or contributing excessive amounts of sediment (Fryxell 2009).

Several bedding areas were noted. In these areas, vegetative cover was reduced and soil disturbance increased. However, these areas were estimated not to exceed 0.5 acre and were not observed to upland sources of sediment or erosion (Moser and Fryxell 2008).

Proper functioning condition surveys were performed on drainages within this grazing area. Four steams were deemed to be in proper functioning condition. This includes one stream crossed by a sheep driveway. After crossing the stream, some compaction was observed with minor trailing and soil displacement. The proper functioning condition for this stream was conducted immediately below the driveway crossing the stream. The fifth drainage received a functional-at-risk rating and will be discussed below.

[15] **Rosgen's Stream Classification System (Rosgen 1996)** The purpose of this system is to classify streams based on quantifiable field measurements to produce consistent, reproducible descriptions of stream types and conditions. There are four levels in Rosgen's classification hierarchy: geomorphic characterization (Level 1), morphological description (Level 2), stream condition assessment (Level 3), and validation and monitoring (Level 4). A more detailed description can be found at http://www.stockton.edu/~epsteinc/rosgen~1.htm. The full classification method is contained in: Rosgen, D. (1996). *Applied river morphology*. Wildlife Hydrology, Pagosa Springs, CO. (http://el.erdc.usace.army.mil/emrrp/emris/emrishelp2/rosgen_s_stream_classification_system_spatial_topics.htm)

The only areas receiving a surface Condition Class rating of 1 was the road, which starts on National Forest System land, and leads towards Blair Lake. The initial portion of the road was put to bed by the Forest Service in the summer of 2008, when it was ripped and seeded. From the ARS/Forest boundary to near Blair Lake, various degrees of rilling, rutting, and gully development were observed (Figure 68). Near the ARS/Forest Service boundary, minimal slash is in place but has not been effective in diverting water from the road. Erosion and gully development are the most severe near the end of the road where there is a 15-20 percent grade. Ruts and gullies are one to three feet in depth. An area of at least 1,000 ft x 10 feet by 3 feet is estimated to be involved (Figure 69). Areas adjacent to the road are used to drive the sheep down to the stream, where they cross on their way to Blair Lake.

Figure 67. Views of Intermittent drainage, North Fork Toms Creek, Park Shale Area

Figure 68. Ruts on road to Blair Lake

Figure 69. Road and erosion, lower portion of road to Blair Lake

The road ends near a Rosgen A4 type stream (Rosgen 1994). The road has functioned as a long term chronic source of sediment to this channel. Based on the proximity of the road to the channel and the contributions of sediment over time, this stream received a functional-at-risk rating. There are no water developments in this grazing area.

Humphrey Ranch

The Humphrey Ranch is grazed from May to October. Some cattle grazing is also conducted on this Ranch to help control vegetation and to improve sheep range conditions. No cattle-related impacts were observed within their grazing area. No evidence of desertification was observed in the field. Six proper

functioning condition surveys were conducted. Five received ratings of proper functioning condition and one received a rating of functional-at-risk. See “Channel and Floodplain Conditions” section later in this report for additional detail. Uplands tended to be well vegetated as indicated by the 89 percent cover. Lushly vegetated lowlands separate the highlands, indicating areas of increased moisture and possible subsurface flow (Figure 71). These low areas “flow” into a major lush lowland that has poorly defined drainage. Some trampling and holding of water within these areas was noted, but was considered very minor.

An earthen dam was formed to develop a watering pond for the sheep. Trailing from “upstream” and “downstream” directions was noted leading to this pond. This pond area is roughly rectangular in shape and covers an estimated 132 square feet. Bank trampling is present and has resulted in vertical bank development on the south side of the pond. Bank height was variable ranging from several inches up to 18 inches or so (Figure 72). Bare and compact ground was present immediately around the pond. The pond and associated bare and compact ground is less than an estimated half-acre. No headcutting above the pond was noted and no down cutting below was noted. Areas below the pond were noted to be especially lush and well vegetated and included equisetum or horsetail, indicative of chronically moist soils.

Two bedding areas were observed within the grazing area. One area, on the shoulder of a hilltop was an estimated 50 ft by 50 ft with no vegetation. Although vegetation was absent and the surface condition was rated as Condition Class 2, there were no observable features indicating surface overland flow, erosion, and sediment transport (Figure 70).

The second bedding area was immediately adjacent to the perennial stream found in the northeastern-most quarter of the grazing area, which is used for watering the sheep. Evidence of use includes bank trampling, some vertical bank development less than ten inches high, trampling in areas next to the stream and some accumulation of fines in areas where water velocity would be less during higher flow. Some channel over-widening was also observed, as were small, vegetated islands (Figure 73). Despite these indicators of use during watering, riparian vegetation was well developed with a variety of age classes, and some hedging due to browsing was noted (Figure 74). Equisetum and iris were also noted. There was no evidence of channel dewatering. Upstream from this area, the amount of use varied and channel width decreased.

Downstream from the area of use channel width also decreased and the absence of excessive fines was observed. Bank incision also decreased both up and downstream from the area of use. The channel was in proper functioning condition below and above the area of use.

Figure 70. View of bedding area, Humphrey Ranch,

Figure 71. View of lowlands, Humphrey Ranch

view to north/northwest

Figure 72. Disturbance around watering pond

Figure 73. Perennial stream, Humphrey Ranch

Figure 74. Riparian vegetation, perennial stream, Humphrey Ranch

Figure 75. Beaver Creek, Humphrey Ranch

The second perennial drainage in this grazing area is located on Beaver Creek, which is in the far western portion of the area. Beaver Creek, where it crosses the road, is a Rosgen E3/E4 channel type, roughly five feet wide, with an anastomosing channel pattern (Figure 75). These channels are defined as low gradient and meandering, characterized by little deposition, and typically found in the bottom of broad low gradient valleys with fine alluvium or lacustrine soils.

The banks were stable and well vegetated and show recovery from past over-widening (Rosgen 1994, Moser and Fryxell 2008). No evidence of degradation related to present grazing activities were noted. However, within the length of reach used for watering there was some decline in condition. This portion

of the stream was rated as in the lower end of the proper functioning condition due to channel over-widening, development of “vegetated islands” due to trampling, minor vertical bank development and the presence of fines, due to livestock watering.

Flood irrigation is used to water sheep. This water is diverted from Modoc Creek, west of the Humphrey Ranch grazing area. The diversion is located on Modoc Creek, a few hundred yards upstream of the confluence with Beaver Creek and about seven miles upstream of the gage, located on Beaver Creek.

When sheep are moved out of the pasture, water diversion canvas dams are removed and the diversion shut off. There are about two miles of irrigation ditch at Humphrey, which has irrigation rights for 2.623 acre-ft from May 1 to October 31. The water used for irrigation falls under water rights # 31-46, 31-47 and 31-48. The amount appropriated for water right 31-46 is 4.0 CFS, while it is 1.6cfs for water rights 31-47 and 48. These three water rights total 7.2 cfs. Average irrigation season flow is 309 cfs for Modoc Creek and the range of average flow from May 1st through October 31st is 1..21-7.45 (Fryxell 2011, Table 47).

Table 47. Compilation of StreamStat data for Dry and Modoc Creeks

Watershed	Area (square mile)	Average Annual Peak Flow (cfs)	7-day, 2-year Low Flow (cfs)	Average Irrigation Season Flow (cfs)	Range of Average Flow 5/1-10/31
Dry Creek	36.9	141	5.6	7.89	1.77-25.5
Modoc Creek	19.1	35.4	1.62	3.09	1.21-7.45

Modoc Creek is an un-gaged stream and flow statistics were developed using StreamStat, a program that utilizes regional regression models to compute flow frequency statistics for any given drainage basin. For this report StreamStats results for median monthly, bankfull l (1.5 year frequency), and low flow (7-day, 2-year) were used. For the area of the ARS pastures, the standard error of estimates was as follows:

- Median monthly-approximately +100 to -50%
- Bank full--+165 to -63%
- Low flow--+43 to -30%

A flow duration curve for Beaver Creek is displayed below in Figure 76.

The X-axis of the graph is the probability of exceedance of a given flow value. The high values on the steep left hand side of graph are snow melt runoff peak values; the long low tail is mid-summer to fall values. Values from zero to 50 percent exceedance probability represent spring to early summer flows while values from 50 -100 percent exceedance probability represent late summer flows.

Flows in Beaver Creek from June through October are less than 50 cfs (cubic feet per second), with flows in mid-July less than 20 cfs (Figure 76).

At Dry Creek average irrigation season flow was estimated at 7.89 cfs and range of average flow from May 1 to October 31 is 1.77-25.5 cfs with the allocated amount to the Sheep Station being 14.2 cfs (Table 47).

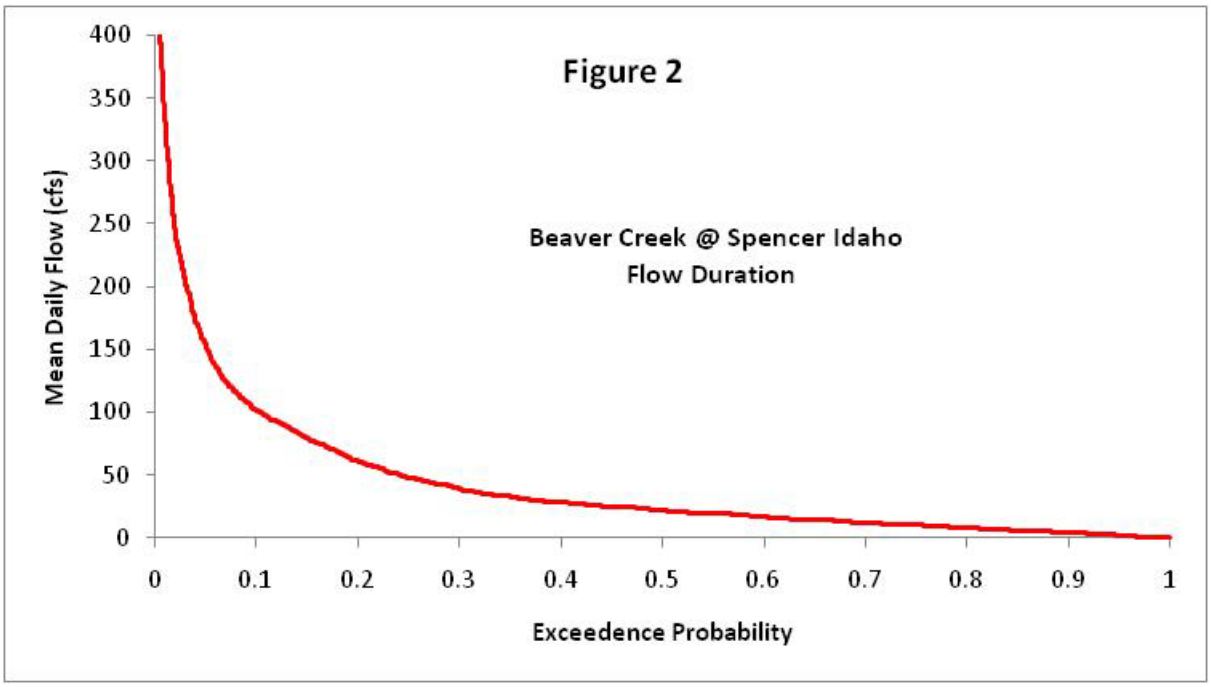

Figure 76. Flow duration curve from the Beaver Creek Gage, during irrigation season (May 1st-Oct 31st)

Henninger Ranch

This grazing area was bought from private owners in the 1940s. During the time of private ownership, it had been a working ranch. Prior to purchase, Henninger had been used for livestock production, with some cropland and hay production. Before purchase by the ARS, grazing was done at heavier rates than current Sheep Station rates (USDA ARS 2009). As a result, a small area (less than an acre) was noted to exhibit characteristics of desertification.

In several areas, desert-like pavement, consisting of a gravelly surface, was present. These areas lacked any vegetative diversity and consisted of only arrow leaf balsam root (Figure 77). The very low gradient surfaces may lend themselves to the effects of wind erosion (Moser and Fryxell 2008). Two proper functioning condition surveys were conducted at this property on Moose and Dry Creeks. Both received ratings of functional-at-risk due to flow diversion and rip-rapping.

Much of the rest of the grazing area is covered by sage brush and underlain by basalts, resulting in little natural surface expression of water. The major drainage that does exist on the property is Dry Creek, which was classified as a Rosgen C4 channel type (Rosgen 1994). A proper functioning condition survey was conducted, and a rating of functional-at-risk with no apparent trend assigned. The functional-at-risk rating was due to alteration of channel flows from irrigation that includes ditching, past agricultural practices, historical rip-rapping of the channel, and possible influences related to the main road leading into the property.

Figure 77. Arrow leaf balsam root field, Henninger Ranch

Irrigation practices were ongoing at the ranch prior to the purchase of the property by ARS, and a well-developed network of irrigation ditches is still present today (Jacobson 2009a). The remains of an historical head-gate, located in the channel proper, are still present. Additional historical management of the channel is evidence by rip-rapping (Jacobson 2009a). The rip-rap has been there so long that portions of it have become entrained as part of the channel bedload and pieces are found deposited within the channels banks (Figure 78).

Figure 78. Historical rip-rapping, Dry Creek, Henninger Ranch

Today, these ditches are used for irrigation and to flood pastures where sheep graze (Figure 79). Maintenance of these ditches is conducted annually. This activity is covered by an exemption from the requirement of a 404 permit by the Army Corps of Engineers (ACOE) as dictated by 33CFR 323.4(a) (3) (Yurczyk 2009a, http://edocket.access.gpo.gov/cfr_2006/julqtr/pdf/33cfr323.4.pdf). Section 404 of the Clean Water Act establishes programs to regulate discharge of dredged or fill material in waters of the United States, including wetlands http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf).

Diversion is accomplished through the use of canvas dams. Diverted water is used for watering sheep and for providing green forage for extended periods of time in dry seasons. The numbers of days that are used each year depend on water availability and grazing needs. Diversions are removed once the sheep are moved out of pasture (Smith and Yurczyk 2008). Water rights at Henninger are Federal Reserved Right Claims (Gough 2009).

Henninger Ranch has the right to use water from May 1 to October 31 of each year. Spring water use is not allowed until the flow in Dry Creek no longer reaches Spring Creek in mid to late June. Average past ten year use is 675 cfs with a high of 1125 cfs in 1999 and a low of 474 cfs in 2000. The average use of 675 cfs translates to 3.7 cfs per day. The low of 474 cfs translates to 2.6 cfs while the high of 1125 cfs translates to 6 cfs per day. The average use of 3.7 cfs indicates that the maximum water right amount of 14.2 allotted for use on Dry Creek is not being used.

The average irrigation season flow for Dry Creek is 7.89cfs and the range of average flow for the period of May 1 through October 31 is 1.77-25.5 cfs (Table 47). See the "Channel Conditions" section for additional information.

Figure 79. Ditching and maintenance, Henninger Ranch

Some cattle grazing is also conducted on this ranch to help control vegetation and to improve sheep range conditions. No cattle-related impacts were observed within the grazing area.

Headquarters Property

The Headquarters property is underlain by flood basalts, resulting in an uneven topography, due to multiple flow events, pressure ridges, lava tubes, "blisters" and other surficial expressions of volcanism. In addition, there appears to be a pattern of regular jointing or fracturing. As a result, there is little water retention and the area is dominated by sagebrush (Figure 54, Moser et al. 2008).

No evidence of desertification was observed. Percent ground cover ranged from 0 to 100 percent, with an average of 73.4 percent. Approximately 10 percent of 128 data points had a soil Condition Class 1or 2. Half of these points were trails or roads, the remainder were small depressions that held surface water or remained moist due to clayey deposits and were trampled by livestock. Compaction and ponding of surface water were the most apparent disturbance (Moser et al. 2008).

No proper functioning condition surveys were conducted on this property due to the lack of drainages sustaining surface flow.

Occasionally, cattle and horses are grazed on Headquarters property to improve sheep range conditions. Numbers are determined on the area and amount of vegetation that needs to be removed (Smith and Yurczyk 2009). No observable effects, related to cattle and horses, on watershed condition was observed.

Best Management Practices, Mitigation Measures and Monitoring Recommendations

BMP measures have been proven effective across the country in managing non-point sources of pollution, and their implementation is required in both Idaho and Montana as part of the Clean Water Act

(Seyedbagheri, 1996, Schuler and Briggs, USDA Forest Service 2002, State of Idaho 1999 and State of Montana 2007)).

For a list of applicable best management practices and mitigation and monitoring, see page 38.

Hydrologic Effects

Measures used for analysis are summarized below in Table 48. The types of direct and indirect effects are the same for all alternatives.

The Sheep Station has water rights on Modoc and Dry Creeks. For analysis purposes, it is assumed that rates of water use would remain the same for alternatives 1, 3, 4 and 5 where the Humphrey and Henninger pastures would be used for grazing. It is assumed that where one or both of these pastures are not grazed then the water rights would not be used (alternatives 2, 3, 4 and 5).

All proposed design features and mitigations measures would be implemented for alternatives 1, 3, 4 and 5. However, if a design feature or mitigation measure is located in a property where grazing would not occur then they would not be implemented.

The percent forage utilized reflects the potential for ground disturbance, erosion, and sediment generation.

Measures Used for Analysis

Table 48 displays a summary of the measures used for analyzing potential effects by alternative.

Table 48. Summary of analysis measures by alternative

Unit of Measure	Alternative 1- Proposed Action/ No New Federal Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Total Miles of Driveway	3.1	0	0	2.3	3.1
Total Miles of Driveway within 300 ft of Streams	1.4	0	0	1.2	1.4
Percent change in Number of Acres Grazed Compared to Alternative 1[a]	0% (47, 606 acres total)	-99%	-39%	-8%	-30%
Additional Measures for Cumulative Effects					
Total Miles of Trail	59.5	0	26.3	49.7	52.9
Total Miles of Trail within 300 ft of Streams	19.8	0	2.71	14.7	17.0

a - A negative number means reduction in acres grazed on ARS properties

Effects Common to All Alternatives

Table 49 displays a comparison of forage utilization for all alternatives. Percent of utilization is used for comparative purposes.

Table 49. Summary of percent utilization by alternative

Property	Available AUMs[a]	Percent AUMs used by Alternative				
		ALT1	ALT2	ALT3	ALT4	ALT 5
Agricultural Research Service Properties	**48,667**	**6.8%**	**0.0%**	**5.9%**	**7.0%**	**4.0%**
Headquarters	28,353	5.6 %	0.0%	9.1%	5.6%	3.9%
Humphrey	4,476	13.5 %	0.0%	0.0%	13.5%	9.4%
Henninger	1,914	23.8 %	0.0%	15.5%	24.6%	16.6%
East Summer Range (Toms Creek)	4,043	3.8 %	0.0%	0.0%	0.0%	2.7%
West Summer Range (Odell Creek/ Big Mountain)	9,811	5.1 %	0.0%	0.0%	7.2%	3.5%
DOE, USDA- Forest Service, DOI-Bureau of Land Management Allotments	**26,087**	**5.8 %**	**0.6%**	**3.9%**	**5.5%**	**1.4%**
Mud Lake	560	28.6 %	28.2%	28.2%	28.6%	29.6%
Snakey-Kelly	1,756	24.0 %	0.0%	19.2%	24.0%	0.0%
East Beaver	17,887	1.2 %	0.0%	0.0%	1.2%	0.8%
Meyers Creek	3,076	2.3 %	0.0%	0.0%	0.0%	1.6%
Bernice	2,808	23.2 %	0.0%	18.5%	23.2%	0.0%

a - Animal Unit Month. By definition, one (1) AUM represents 790 lbs of dry forage consumed over 30.44 days by a 1,000-lb cow that is nursing a calf. For the purposes of this table, five (5) sheepc are equivalent to one (1) AUM

Total miles of driveway and total miles of driveway within 300 feet of streams does not vary substantially between alternatives 1, 4 and 5, and there would essentially be no differences between direct and indirect effects for these three alternatives. Alternatives 2 and 3contain zero miles of driveway and zero miles of driveway within 300 feet of streams. Although there would be a decrease in direct and indirect effects, the decrease in erosion and sediment generation would not be measurable (Table 48).

As there are no discernable direct and indirect effect for total miles of driveway and total miles of driveway within 300 feet of streams and therefore, no cumulative effects.

Hydrologic Direct/Indirect Effects

Under alternative 1, there would be no change in the amount of acreage grazed compared to existing operations (Table 48).

Alternative 1 - Direct/Indirect Effects

Alternative 1, the proposed action, also represents current operations at the Sheep Station as well as no new federal action. Alternative 1 would continue grazing at Headquarters, Humphrey, Henninger, and the Summer Range. Under this alternative, the number of sheep grazed and the grazing schedule would be the same as what is currently implemented. All properties currently in use would still be used (Headquarters, Humphrey, Henninger, Summer Range). Planned activities that would be conducted in addition to grazing include road and fire break maintenance at Headquarters and Henninger; fence maintenance at Headquarters, Humphrey and Henninger Ranches, and in the Summer Range; and maintenance of water developments in Humphrey and Henninger Ranches as well as in the Summer Range.

The primary direct effect is ground disturbance and water withdrawal. The total acreage grazed under alternative 1 is the same as current operations. There would be no discernable difference in ground disturbance (Table 48).

Principal indirect effects would be erosion and sediment introduction into streams and alterations of stream flow and channel morphology. The type and magnitude of direct/indirect effects, both of a short

term and long term nature, for all 6th level watersheds (Table 41) except 100200012102 are generally not expected to change with the implementation of the proposed action. There are two exceptions to this generalization in alternative 1. The first is in watershed 100200012102 where there would be a reduction of localized sediment sources at OD4 and OD 5 (see Hydrology Report, page 53). The second exception is in watershed 100200012202, on the road to Blair Lake (see Hydrology Report, page 53). As current management and alternative 1 are one in the same, there would be no quantifiable changes to the measures used for analysis, shown in Table 48.

There would be no modification to current floodplain function, water-influenced soils and riparian areas as there would be no change in utilization alternative 1.

Recovery from past prescribed burns would continue and as these areas recover their ground cover the risk for transportation of surface sediment would decline. Monitoring has shown that within two years forbs and grass cover returns, minimizing the potential for erosion.

Forty-seven acres could be treated with herbicides under alternative 1, which is the same as current management. Herbicides listed in Table 40 on page 174 are used at the Sheep Station. By implementing recommended BMPs and buffers, surface water contamination would be reduced both in the short and long term. Long-term effects to water quality would also be reduced through BMP application (see Hydrology Report, page 54).

For a discussion of BMP effectiveness, the reader is referred to page 43 in the Hydrology Report. Additional direction regarding herbicide applications at the Sheep Station is found in Appendix C – ARS Sheep Station Integrated Invasive Plant and Weed Control.

There would be no change in effects to water-influenced soils and riparian areas as the number of sheep and grazing locations would not change.

The short term effect of withdrawing water would continue. Indirect effects related to water withdrawal, such as potential impacts to channel function would continue in the long term as long as water is withdrawn in Modoc Creek (6th field watershed 170402140404) and Dry Creek (6th field watershed 170402140607). (See Hydrology Report, page 52)

Alternative 1 - Non-ARS Lands Used by the Sheep Station

Grazing would continue on Snakey-Kelly, Bernice, Meyers Creek, and Bernice grazing allotments and Mud Lake Feedlot. The number of sheep would not change from the sheep currently being grazed. The effects of the Sheep Station grazing operations on these properties would not vary from those analyzed in the NEPA done for the allotments by their respective agencies.

Alternatives 2 - 5 Summaries

Table 49 summarizes how the percent utilization would vary by alternative. In total, alternatives 2, 3, and 4 have reduced numbers of sheep that would be grazed, and alternative 4 would graze the same number of sheep.

Alternatives 2-5 reconfigure grazing options. The number of AUMs utilized varies by alternative. In general, there would be a reduction from minus one percent to 100 percent across alternatives and properties. This reconfiguration of grazing, in a few instances, would increase the numbers of AUMs utilized on a property.

Under alternative 3 total utilization would go from 5.6 percent under alternative 1 to 9.1 percent. An increase in utilization of only 3.5 percent

Under alternative 4 on Henninger Ranch total utilization would go from 23.8 percent under alternative 1 to 24.6 percent under alternative 4; an increase in utilization of only 0.8 percent. On the West Summer Range, total utilization would go from 5.1 percent under alternative 1 to 7.2 percent under alternative 4; an increase in utilization of only 2.1 percent.

Under alternative 5 on the Mud Lake total utilization would go from 28.6 percent under alternative 1 to 29.6 percent under alternative 5; an increase in utilization of only 1 percent.

Alternative 2 – Direct/Indirect Effects

No direct or indirect effects related to grazing, and prescribed burning, such as ground disturbance and introduction of sediment, would occur under this alternative (Table 48). Water rights would not be utilized and there may be potential local improvements to flow. Indirect effects to channel morphology related to water withdrawal would decrease and there could be potential local improvements to flow. Indirect effects related to road and firebreak maintenance would occur as described under alternantive1, but indirect effects related to fence and water development maintenance would not.

These changes to direct and indirect effects, both those that are short and long term, would occur in all 28 6th level watersheds involved in this project (Table 41). Existing sources of sediment from the road to Blair Lake, at sheep crossing points OD 4 and OD5, and at the mine waste water pond would continue, as mitigation measures would not be implemented (Figure 60). Although decreases would occur for both direct and indirect effects these changes may not be detectable due to the size of these 6th level watersheds.

Alternative 2 - Non-ARS Lands Used by the Sheep Station

No grazing would occur on the Snakey-Kelly, East Beaver, and Bernice and Meyers Creek allotments under this alternative, and utilization on all allotments would decrease to zero. Although decreases would occur for both direct and indirect effects these changes may not be detectable due to the size of these 6th level watersheds.

An increase of one percent utilization on the Mud Lake feedlot in this alternative over alternative 1 would have no discernable effects at the 6th watershed level.

Alternative 3 - Direct/Indirect Effects

Direct and indirect effects, both short and long term, as described in alternative 1 would be reduced on Humphrey Ranch, the East Summer Range, and West Summer Range as there would be no grazing. The effects would be the same as for alternative 2.

Under alternative 3, forage utilization on Headquarters would increase by 3.5 percent. When compared to alternative 1, no discernable difference would be expected for direct and indirect effects. This is due to the size of the Headquarters property, which is approximately 28,000 acres. The Headquarters property is located in watersheds 170402140101, 170402140401 and 170402140501.

Alternative 3- Non-ARS Lands Used by the Sheep Station

For the Mud Lake feedlot, the effects, in both the short and long term, would be similar to those described in alternative 1, as AUMs utilized would only increase by 0.8 percent. For the Snakey-Kelly allotment, there is a 4.8 percent decrease in the number of AUMs utilized. Although the decrease in AUMs utilized

would result in a decrease in both effects, for both the short term and the long term, effects may not be discernable as the allotment is approximately 5,800 acres (Table 48).

For the East Beaver and Meyers Creek allotments utilization would not change and there would be no change to existing levels of direct and indirect effects in watersheds 170402140404, 405, 406,407, 408 and 60, 1002000012101 and 170402020803(Table 48).

Utilization would decrease by 4.7 percent in the Bernice allotment. No discernable effects would be occurring in watersheds 170402160101,170402170101, 301, 302 and 170402171101.

Alternative 4 - Direct/Indirect Effects

The direct and indirect effects, both short term and long term are the same as described in alternative 1 for Headquarters and Humphrey.

On the East Summer Range, grazing would be discontinued. As a result, there would be a decrease in existing levels of direct and indirect effects when compared to alternative 1 (Table 48). In addition, mitigation measures would not be implemented on the road to Blair Lake and existing levels of erosion and sediment introduction would continue.

Compared to alternative 1, the number of AUMs utilized on Henninger would increase by 0.8 percent and on the West Summer Range utilization would increase by 2.1 percent (Table 48). As utilization increases are so low, no discernable changes, when compared to alternative 1, would be expected for both short- and long-term direct and indirect effects as described in alternative 1.

As a result, no discernable difference between short- and long-term direct and indirect effects as described in alternative 1 would be expected. Mitigation measures recommended for sheep crossings at OD 4 and OD 5 would be implemented and effects would be expected to be the same as described in alternative1.

Alternative 4 - Non-ARS Lands Used by the Sheep Station

Under this alternative, there would be no change in the number of AUMs for the Snakey-Kelly, East Beaver, and Bernice allotments and the Mud Lake feedlot. As a result, there would be no discernable changes to existing levels of direct and indirect effects at the 6th field watershed level.

Ending grazing on the Meyers Creek allotment would reduce utilization from 2.3 percent to zero percent, and the change would not be discernable at the 6th field watershed level.

Alternative 5 - Direct and Indirect Effects: ARS Properties

Alternative 5 would have the same type of direct effects (water diversion, ground disturbance) and indirect effects (alteration of channel morphology and function due to water withdrawal, sediment introduction) as described in alternative 1, although the magnitude of effects would decrease in all of the ARS properties grazed (Table 48). This would apply to both short- term and long-term effects as described in alternative 1. Mitigation measures would be implemented on the road to Blair Lake, at sheep crossing at OD 4 and 5 and at the drainage exit to the mine wastewater pond (Figure 60). Effects would be expected to be the same as under alternative1.

Alternative 5 - Non-ARS Lands Used by the Sheep Station

Utilization for the Mud Lake feedlot would increase from 28.6 percent under alternative 1 to 29.6 percent for alternative 5. Utilization on East Beaver and Meyers Creek allotments would be reduced from 1.2

percent to 0.8 percent and 2.3 percent to 1.6 percent respectively. These changes would not be discernable at the 6th level watershed due to scale.

No grazing would occur on the Snakey-Kelly and Bernice allotments under alternative 5. The effects would be the same as discussed under alternative 2.

Hydrologic Cumulative Effects

Alternative 1 - Cumulative Effects

As there were no predicted changes in direct and indirect effects to watershed condition, hydrology, riparian, channel and floodplain conditions, springs and wetlands, and water quality in all watersheds except 100200012102 and 100200012202; there would be no cumulative watershed effects.

In watersheds 100200012102 and 100200012202 existing levels of sediment would be reduced locally at points OD 4 and 5 and on the road to Blair Lake. Decreases would be related to implemented design features and mitigation measures. This would result in a decrease to existing cumulative watershed effects. However, the decrease would likely not be measurable in either 6th level watershed due to scale.

Alternatives 2 - 5 Cumulative Effects

Because there are no discernable direct/indirect hydrological effects under alternative 2 - 5 there are no cumulative effects.

Compliance with Relevant Laws, Regulations, Policies and Plans

These alternatives would meet the intent of the Clean Water Act and the Executive Orders for wetlands and floodplains.

Other Relevant Mandatory Disclosures

There are no other relevant mandatory disclosures for alternative 1.

Summary of Effects

Alternative 1

The type and magnitude of direct/indirect effects is expected to remain the same except for reductions in localized sediment transportation that would be reduced at two sheep driveways (OD4 and OD 5) located in the watershed 100200012102 and on the road to Blair Lake (watershed 100200012202), where mitigation measures would be implemented.

Alternative 2

The type and magnitude of direct/indirect effects would be expected to be less than those discussed in alternative 1 as there is a 6.8 percent reduction in AUM utilization on ARS properties and a 5.2 percent reduction in AUM utilization on the allotments used by the Sheep Station. However, changes may not be measurable at the 6th watershed level, and therefore there are no cumulative effects.

Alternative 3

The type and magnitude of direct/indirect effects would be expected to be less than those discussed in alternative 1 as there is a 0.9 percent reduction in AUM utilization on ARS properties and a 1.9 percent

reduction in AUM utilization on the allotments used by the Sheep Station. However, changes may not be measurable at the 6th watershed level, and therefore there are no cumulative effects.

Alternative 4

The type and magnitude of direct/indirect effects would be expected to be less than those discussed in alternative 1 as there is only a 0.2 percent increase in AUM utilization on ARS properties and a 0.3 percent reduction in AUM utilization on the allotments used by the Sheep Station. However, changes may not be measurable at the 6th watershed level, and therefore there are no cumulative effects.

Alternative 5

The type and magnitude of direct/indirect would be expected to be less than those discussed in alternative 1 as there is a 2.8 percent reduction in AUM utilization on ARS properties and a 4.4 percent reduction in AUM utilization on the allotments used by the Sheep Station. However, changes may not be measurable at the 6th watershed level, and therefore there are no cumulative effects.

Irretrievable and Irreversible Commitment of Resources

Streamflow diverted for irrigation purposes is irretrievably lost from the bypass reach. This commitment is not irreversible, since the diversion could be removed or the water right not used.

Botany

Effects to the botany resource are subject to the Endangered Species Act.

Botany Summary

There would be no impacts to federally listed plant species from any alternatives proposed, because no species occur and no habitat is present within Agricultural Research Service properties.

Compliance with Relevant Laws, Regulations, Policies and Plans

All alternatives proposed within this environmental assessment would be in compliance with threatened and endangered plants according to the Endangered Species Act.

Heritage Resources

Activities on the Sheep Station are governed by the National Historic Preservation Act (NHPA) of 1966 as amended, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, and the Archaeological Resources Protection Act.

Desired Condition

Properties under the purview of the ARS, and the activities associated with the stated Mission objectives, would be reviewed for compliance with the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA) of 1966 as amended.

Under the NHPA and its attendant regulations found at 36 CFR Part 800, an inventory strategy and management plan for the Sheep Station has been developed in consultation with the Idaho and Montana State Historic Preservation Offices (SHPOs).

Heritage Summary

Grazing and associated activities at the Sheep Station have occurred for approximately 86 years. Knowledge of prehistoric archaeological data is limited within the Agricultural Research Service properties, but such sites and resources are known to exist. Ranching, mining, and Sheep Station activity and development make up the historic component for the area.

The Sheep Station has proposed several activities over the course of the next five years. To comply with Section 106, a Heritage Management Plan has been developed. This plan establishes a baseline from which to begin heritage work. Both Montana and Idaho State Historic Preservation Offices have approved the Heritage Management Plan.

Selection of any alternative would require Heritage review.

Compliance with Relevant Laws, Regulations, Policies, and Plans

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects that their federally funded activities and programs have on significant historic properties. "Significant historic properties" are those properties (historic and prehistoric) that are included in, or eligible for, the National Register of Historic Places. Properties that have not been evaluated for significance are considered eligible until such evaluation occurs. The National Register is a list of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, and culture. The National Register is administered by the National Park Service in conjunction with the State Historic Preservation Offices (SHPOs).

As defined in 36 CFR Part 800 (Protection of Historic Properties as amended in August 2004), the Section 106 process and compliance with such also includes the coordination with other reviews, including NEPA, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, the Archaeological Resources Protection Act and any agency specific legislation (36 CFR Part § 800.3). Coordination and consultation with Idaho and Montana State Historic Preservation Offices would fulfill compliance with Section 106 of the National Historic Preservation Act.

As proposed, the Heritage Management Plan (Plan) would consider all activities in the Agricultural Research Service, U.S. Sheep Experiment station five-year action plan for Section 106 compliance procedures. The Plan would also include survey, recording and evaluation of Agricultural Research Service historic facilities, and provide a guidance plan for general maintenance and facility use of the historic resources.

The Plan would provide for a phased compliance survey procedure. According to 36 CFR Part 800, a phased identification and evaluation is possible when:

> …alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it s specifically provided for in a memorandum of agreement executed pursuant to § 800.6, a programmatic agreement executed pursuant to §800.14 (b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to §800.8 (36 CFR Part 800.4).

The phased-in compliance procedure would be conducted in consultation with the Idaho State Historic Preservation Office and would provide direction for surveying areas of high probability regarding the potential occurrence of historic properties. This would include a sampling procedure of the high

probability areas, phased in over a three- to five-year period, depending on the occurrence of historic properties.

Socioeconomics

There are no federal laws and regulations applicable to socioeconomics. The existing condition is considered the baseline for comparison of alternatives.

Socioeconomic Summary

The Sheep Station is the largest employer in Clark County. Consequently it provides important economic contributions to local businesses and public services. Under the alternatives there would be not net change in social or economic conditions. Under the action alternatives effects would occur as a result of changes in information generated from research programs, and substitute uses of public lands no longer being grazed. Effects to the sheep industry are unquantifiable given the lack of data, but it is reasonable to assume that adverse effects increase as grazing decreases.

Socioeconomic Affected Environment

Based on comments received during public scoping two analysis areas are considered: the importance of Sheep Station salary related impacts are considered within Clark County, ID while non-salary related station expenditures are considered for a larger analysis area that includes Beaverhead County in Montana and Clark, Bonneville, Jefferson and Madison counties in Idaho. Housing, commuting and expenditure patterns of Sheep Station employees suggest that the primary economic area of concern for salary related impacts is Clark County. However, almost all non-salary related station expenditures occur within the surrounding area outside of Clark County. Thus two analysis areas allow for measurement of the importance of Sheep Station employee expenditures within Clark County while also considering effects within the larger 5 county area where non-salary expenditures are made. Using two analysis areas avoids potential dilution of important relationships with Clark County while also comprehensively examining the role of the Station’s contributions on the surrounding area economy.

The most recent US Census data for employment in the Sheep Station economic analysis area is for the year 2000. Given the changes in population, and possible changes to industry composition, a secondary data source is utilized to report employment and income. Minnesota IMPLAN Group (MIG) reports annual economic data for all counties in the United States. MIG utilizes national, state and local data sources to report employment, and includes full-time, part-time, seasonal and self employment. Therefore, IMPLAN data is reported simply as jobs, not full time equivalents (FTEs), and one person with multiple jobs would show up more than once in the data. This prohibits the comparison to local population data provided by the US Census.

According to 2009 IMPLAN data, total employment is 664 jobs in Clark County and 91,795 in the 5 County analysis area. Table 50 reports the shares of total employment by industry. The most prominent industries in terms of employment are the Government and Retail Trade sectors in Clark County and the 5 County analysis area, respectively. Jobs supported by the Sheep Station are within the government sector and provide 14 percent of all Government employment in Clark County. According to 2009 IMPLAN data, there are a total of 44 non-military Federal jobs. Currently the Sheep Station supports 23 full-time Federal employees and 2 University of Idaho employees. In addition to these full-time positions, the Sheep Station also supports a variety of non-permanent jobs, including postdoctoral fellows, student interns, and intermittent general duty employees.

Table 50. Employment in Clark County and the 5 County analysis areas by sector

	Clark County	5 County Analysis Area
Ag, Forestry, Fishing & Hunting	25.7%	5.8%
Mining	0.9%	0.3%
Utilities	0.0%	0.1%
Construction	0.4%	8.1%
Manufacturing	5.0%	4.3%
Wholesale Trade	0.6%	6.3%
Retail trade	6.8%	13.2%
Transportation & Warehousing	2.6%	3.2%
Information	2.9%	1.9%
Finance & insurance	1.8%	2.6%
Real estate & rental	5.8%	4.3%
Professional- scientific & technical services	2.1%	5.6%
Management of companies	0.0%	0.1%
Administrative & waste services	4.6%	3.3%
Educational services	0.6%	3.6%
Health & social services	4.4%	10.5%
Arts- entertainment & recreation	0.6%	1.4%
Accommodation & food services	2.2%	6.7%
Other services	7.0%	6.3%
Government	26.1%	12.3%
Total	100%	100%

Source: Minnesota IMPLAN Group, 2009

IMPLAN® is an input-output model describing commodity flows from producers to intermediate and final consumers. The total industry purchases are equal to the value of the commodities produced. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services continues until leakages from the region stop the cycle. The resulting sets of multipliers describe the change of output for regional industries caused by a change in final demand in an industry. The IMPLAN database describes the economy in 440 sectors. IMPLAN® is used to create complete, extremely detailed Social Accounting Matrices and Multiplier Models of local economies. MIG, Inc. provides software tools, region-specific data, and outstanding technical support to enable users to make in-depth examinations of state, multi-county, county or sub-county, and metropolitan regional economies. http://www.implan.com/

Expenditures by the Station have an economic contribution to Clark County and the larger 5 County analysis areas. Non-salary or operational related expenses made by the station largely occur outside of Clark County since opportunities to purchase supplies and equipment are not available within the county. On an average annual basis approximately $415,000 is spent on feed, materials, supplies, equipment and services in the 5 county analysis area. As a result of these expenditures the station supports 11.3 total jobs (direct, indirect and induced) and $265,919 in total income on an average annual basis. In addition, salary related expenditures by the station total $1,166,065 within the 5 County analysis area and support an additional 27.4 total jobs (direct, indirect and induced) and $1,275,583 in total income on an average annual basis. Consequently, the Station supports 38.7 total jobs (direct, indirect and induced) and $1,541,502 in total income within the 5 county analysis area on an average annual basis as a result of salary and non-salary related expenditures (MIG 2009).

While non-salary expenses by the station mostly occur outside of Clark County, salary related expenditures occur within Clark County to a greater degree. The 23 people employed at the station are paid a total of $1,166,065 in annual salaries. Of the total salary paid, $842,227 is earned by residents of

Clark County. Thus, the direct contribution to employment and income is 23 jobs and $842,227 in household income. A portion of household income is then spent locally which increases the total economic contribution. There is no precise measure of local spending patterns of Station employees however, given the lack of retail related and other household purchasing opportunities in Clark County (see Table 50 above) it is likely that a large proportion of purchases of household goods and services are made outside of the study area. The total employment and income contribution of salary related expenditures to Clark County were estimated assuming local household expenditures could occur within Clark County across a range of 5 to 75 percent (Table 51). Examination of this range of potential salary expenditures suggests, the total contribution could range from 23.13 jobs and $843,998 in income, to 24.3 jobs and $929,437 in income. This accounts for 3.5 to 6 percent of total employment and 4 to 4.5 percent of total income within Clark County.

Table 51. Total salary related contributions from a range of station expenditures in Clark County

	Jobs	Percent of Total County Employment	Income	% of Total County Income
5 percent	23.1	3.48%	$843,998	4.11%
10 Percent	23.2	3.49%	$853,855	4.16%
25 Percent	23.4	3.53%	$871,297	4.24%
50 Percent	23.9	3.60%	$900,367	4.39%
75 Percent	24.3	3.67%	$929,437	4.53%

Source: MIG 2009

In addition to contributing to employment and income, activities at the Sheep Station also affect the total tax base. Table 52 displays the total tax contribution from salary related expenses within Clark County. The largest contribution falls within the federal social security and income taxes. These taxes should have no direct bearing on the current state of Clark County's economy as such funds are allocated to the federal government and are not immediately spent on local services. However, other tax categories such as property tax, motor vehicle licensing and sales tax may affect to the total funding available for operating services such as law enforcement, roads, and schools. Thus, the tax base supported by Sheep Station activities provides for improved social and economic conditions.

In addition to economic stimulus in the form of employment and monetary flows, there is also the knowledge gained with the research conducted at the Sheep Station. It is the sole sheep research facility specializing in range sheep in the United States west of the 100th meridian. Seventy percent of all sheep and lamb products produced in the Country come from the western states, the vast majority of which are range fed. Thus, the research conducted at the Sheep Station in Dubois is carried out in conditions very similar to those under which a large proportion of sheep producers operate (Orwick 2008). Research valuable to the production of sheep and lamb products includes the mapping of specific genetic traits resistant to certain types of disease allowing for better health management, as well as the identification of traits important to both the maternal and paternal side of reproduction. Such information aids in the production efficiency of operations as the more healthy lambs born, the more competitive farmers and ranchers may be in today's dynamic agricultural markets. Furthermore, research regarding how sheep respond to drought cycles and the associated change in the nutritional value of plant species is valuable when dealing with issues of climatic change in rangelands. Thus, the activities associated with Sheep Station management have implications for agricultural productions across the Country, and have proven valuable to farmers and ranchers involved in the sheep industry.

Table 52. Implications for local taxes

Tax		Total Contribution
Federal Government Non-Defense	Corporate Profits Tax	$3,931
	Indirect Bus Tax: Custom Duty	$108
	Indirect Bus Tax: Excise Taxes	$334
	Indirect Bus Tax: Fed Non-Taxes	$286
	Personal Tax: Estate and Gift Tax	$0
	Personal Tax: Income Tax	$580
	Personal Tax: Non-Taxes (Fines- Fees	$0
	Social Ins Tax- Employee Contribution	$3,881
	Social Ins Tax- Employer Contribution	$2,167
	Total	$11,286
State/Local Government Non-Education	Corporate Profits Tax	$2,431
	Dividends	$10,123
	Indirect Bus Tax: Motor Vehicle License	$405
	Indirect Bus Tax: Other Taxes	$677
	Indirect Bus Tax: Property Tax	$2,942
	Indirect Bus Tax: S/L Non-Taxes	$714
	Indirect Bus Tax: Sales Tax	$9,002
	Indirect Bus Tax: Severance Tax	$0
	Personal Tax: Estate and Gift Tax	$0
	Personal Tax: Income Tax	$582
	Personal Tax: Motor Vehicle License	$127
	Personal Tax: Non-Taxes (Fines- Fees	$201
	Personal Tax: Other Tax (Fish/Hunt)	$39
	Personal Tax: Property Taxes	$14
	Social Ins Tax- Employee Contribution	$54
	Social Ins Tax- Employer Contribution	$135
	Total	**$27,446**
Total		**$38,732**

Source: MIG 2009

Research valuable to the production of sheep and lamb products in the United States includes the mapping of specific genetic traits resistant to certain types of disease allowing for better health management, as well as the identification of traits important to both the maternal and paternal side of reproduction. Such information aids in the production efficiency of operations as the more healthy lambs born, the more competitive farmers and ranchers may be in today's dynamic agricultural markets. Furthermore, research regarding how sheep respond to drought cycles and the associated change in the nutritional value of plant species is valuable when dealing with issues of climatic change in rangelands. Thus, the activities associated with Sheep Station management have implications for agricultural production across the nation.

Socioeconomic Direct/Indirect Effects

Effects Common to all Alternatives

Under all the alternatives there would be no change from the current socioeconomic conditions depicted above. The Station would continue to support 38.7 total jobs (direct, indirect and induced) and $1,541,502 in total income within the 5 county analysis area on an average annual basis as a result of salary and non-salary related expenditures (MIG 2009). In addition, salary and tax related contributions within Clark

County (Table 51 and Table 52) would continue to be supported on an average annual basis. Forage utilization and sheep numbers are expected to change under the alternatives however; the Station budget is not expected to change under any of the alternatives. As a result of decreases in sheep inventory or forage utilization employment associated with herding could decrease however, employment associated with other station activities would increase resulting in no net decrease in employment or total salaries paid. For example, research technicians could replace herders. Therefore, no changes to the Station employment, income or tax contributions depicted above are anticipated.

Effects Common to all Action Alternatives

Under all action alternatives there could be effects on the sheep industry resulting from potential reductions in research capacity at the station. Current research contributions to the sheep industry are summarized in the affected environment. Sheep Station research is dynamic; and therefore impossible to predict the full extent of impacts to sheep producers and the entire industry. However, it is reasonable to assume that if a reduction in grazing related research occurs, adverse impacts to the sheep industry could also occur.

Additional consequences may stem from changes that could occur to the use of federal lands as a result of changes to the Sheep Station grazing regimen. Under all alternatives sheep grazing would be scaled back. This could allow for additional opportunities for recreation and environmental conservation. Some uses of the lands may have implications for the economic health of Clark County. For example, increases in recreational opportunities could increase visitation rates, and thus increase expenditures at local business and firms. However, given the volume of public lands in Idaho and Montana, it is unlikely that grazing by the Sheep Station would substantially affect recreational travel, thereby limiting the implications for local business.

Socioeconomic Cumulative Effects

No net change in employment and income effects are anticipated under the alternatives since salary and non-salary expenditures made by the Station are not anticipated to change amongst the alternatives. Consequently no cumulative effects to local employment, income or tax contributions would occur.

Cumulative effects to the value of research conducted at the station would be similar under all the action alternatives. With the potential for loss of grazing related research capacity at the station, cumulative effects could occur to the sheep industry. Such cumulative effects would occur if other research institutions (University, Extension, County institutions etc.) are no longer able to contribute to the field. Assessing the potential for such effects is impractical however, as noted throughout the EIS, the value of research conducted at the station should not be considered inconsequential thus cumulative effects to the industry from decreased capacity could be substantial.

Environmental Justice

The Environmental Justice principles set forth in Executive Order 12898 and CEQ (1997) were considered in regards to activities on the Sheep Station. Alternatives were reviewed to determine whether or not the proposed actions adversely impact minority and low-income populations. Salary and non-salary expenditures by the Station are anticipated to continue at current levels under all the alternatives thus no net change in current economic conditions is anticipated. However with changes in operations and associated station expenditures, adjustments in area employment and income could occur. Given presence of low income and minority populations in the analysis area these populations could be affected by these adjustments. Regardless, any adverse indirect or induced effects would be spread amongst all segments of the population despite their racial, ethnic or poverty status.

While no net decrease in economic conditions are anticipated, the effects to human health of environmental justice populations are of concern. There are risks associated with sheep grazing activities and sheepherders may be of minority or low income groups. However, the alternatives do not increase time spent by herders in the field or possible exposure to such risks. In addition, such exposure risks do not present a disproportionate adverse impact minority or low income groups under the alternatives. Any alternative that would reduce grazing would likely reduce exposure to human health risks rather than increase disease risk for any ethnic or income group. Additionally, the alternatives would not cause any significant changes to community composition or the social dynamic of Clark County. Economic and demographic composition would likely remain the same as a result of the alternatives. Therefore, there are no disproportionate adverse impacts to minority or low income groups.

Chapter 4 - Consultation and Coordination

Preparers and Contributors

Troy Grooms, Rangeland Specialist, USDA FS TEAMS
Vince Archer, Soil Scientist, USDA FS TEAMS
George Chalfant, Soil Scientist, USDA FS TEAMS
Charles Jankiewicz, Rangeland Specialist, USDA FS TEAMS
Eric Moser, Hydrologist, USDA FS TEAMS
Jim Dilley, Botanist, USDA FS TEAMS
Jenny Fryxell, Hydrologist, USDA FS TEAMS
Julie Laufman, Botanist, USDA FS TEAMS
Lucretia Smith, GIS, NNIS, Rangeland Specialist, USDA FS TEAMS
Steve Kozlowski, Wildlife Biologist, USDA FS TEAMS
Sue Wingate, ID Team Leader, USDA FS TEAMS
Frank Yurczyk, Rangeland Specialist, USDA FS TEAMS
Amanda Campbell, Archaeologist, USDA FS TEAMS
Kristin Whisennand, Technical Writer/Editor, USDA FS TEAMS
Joshua Wilson, Economist, USDA FS TEAMS
Henry Eichman, Economist, TEAMS
Quinn Jacobson, Rangeland Scientist, University of Idaho
Greg Lewis, Research Leader, ARS USSES
Corey Moffet, Rangeland Scientist, ARS USSES
Bret Taylor, Animal Scientist, ARS USSES
Mark Williams, Animal Supervisor, ARS USSES

List of Recipients - Draft Environmental Impact Statement

The following lists are the agencies, tribes, organizations and individuals who either commented during the scoping period, or who asked to be notified when the DEIS was available.

Federal, State, and Local Agencies

EPA, Region 10	Lynne Mcwhorter
Bureau of Land Management	Tim Bozorth
Beaverhead-Deerlodge National Forest	NEPA Coordinator
Caribou-Targhee National Forest	NEPA Coordinator
US Fish and Wildlife Service Eastern Idaho Field Office	Damien Miller, Supervisor

Tribes

Boyer Smith	Cultural Resource Program, Shoshone-Bannock Tribes
Broncho	Policy Representative, Shoshone-Bannock Tribes
Coby	Chairman, Fort Hall Business Council, Shoshone-Bannock Tribes
Osborne	Acting Fish and Wildlife Director, Shoshone-Bannock Tribes
Tuell	Environmental Program Manager, Shoshone-Bannock Tribes

Other Recipients

Organizations

American Sheep Industry	Mary Jensen
Center for Biological Diversity	Marc Fink
Gallatin Wildlife Association	Paul Griffin
Hagenbarth Livestock	Jim Hagenbarth
Helle Livestock	John Helle
Montana Director Greater Yellowstone Coalition	Barb Cestero
National Parks Conservation Association	Patricia Dowd
National Wildlife Federation	Thomas France
Natural Resources Defense Council	Louisa Wilcox
Natural Resources Defense Council	Andrew Wetzler
Natural Resources Defense Council, Wildlife Program	Whitney Leonard
Pintler Audubon Society	Jack Kirkley
Rocky Mountain Region Representative Defenders of Wildlife	Dave Gaillard
Safari Club International	William Mealer
Sierra Club Intern, Eastern Idaho	Kathryn Dixon
US Meat Animal Research Center	Kreg Leymaster
Wildlife Conservation Society	Jon Beckmann
Wildlife Program Natural Resources Defense Council	Whitney Leonard

Individuals

Paul Frieseman

Marcia Maroon

Charles Neal

Brad Bauer

H.L. Chrissos

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