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

Rangeland Resource Report

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for:

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Dubois, Clark County, Idaho Date

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Abstract

This rangeland report describes ARS sheep grazing operations and the rangeland resource for the U.S. Department of Agriculture, Agricultural Research Service (ARS), U.S. Sheep Experiment Station, Dubois, Idaho (Sheep Station). The report describes grazing history, current station operations, existing conditions and grazing effects for Headquarters Property, Henninger and Humphrey Ranches and, East and West Summer Range. In 2009 an interdisciplinary team conducted a field survey of each property. Survey results indicate stable soils and none, slight to light utilization (Table 3). Results also indicate that sheep driveways, trailing, watering, and bedding areas; which comprise less than one percent of each pasture; display heavy use (UDSA 2009). Surveys conducted between 1989 and 2009 indicate that with continued grazing under current deferred and rotational grazing systems, the ground cover conditions (including biomass, taxonomic composition, and species richness) would remain static or move in an upward trend.

Vegetation and site condition comparisons on exclosures, established in 1940, 1960 and 1978, (and not grazed for 30 to 70 years or more), indicate no differences in all sample components, which include plant species composition, inside and outside of the exclosures. The use of rotational, and deferred grazing systems along with rest from grazing and using light to moderate stocking rates resulted in fair to good range conditions with a static to upward trend. Only portions of Henninger Ranch, where soils are stable with overall and there is light utilization overall, were some species composition and rangeland condition concerns noted due to heavy browse species use.

Range condition and trend for alternatives 2 through 5 provide a variety of stocking rates, AUMs used, grazing and non-grazing options associated with ARS properties and grazing allotments. All alternative stocking rates are within 1.2 to 25 percent of available AUMs, except Mud Lake feedlot where 29.6 percent of available AUMs would be used under alternative 5.

General Summary of Range Conditions

Range condition surveys on ARS lands 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.

2009 ARS Sheep Station Rangeland Surveys

In 2009 ARS Headquarters, Henninger, Humphrey, East and West Summer Range were assessed by an interdisciplinary team consisting of rangeland management specialists, wildlife biologist, soil scientist, and hydrologist. Results of the 2009 range surveys indicate overall good range conditions (USDA 2009).

Headquarters soils are stable with desirable forb, shrub, and grass diversity. Utilization is none to slight (Table 3). Rotational and deferred grazing systems, along with pasture rest during the primary growing season with light stocking rates have contributed to the current fair range conditions with static trend. Only small (less than 50 total acres) areas representing less than one percent of the area grazed (sheep trailing/watering/bedding) showed heavy use. Headquarters property is grazed April 23 to June 25 and September 1 to November 1.

Humphrey soils are very stable with desirable forb, shrub, and grass diversity. Utilization is light (Table 3) with rams and small groups of sheep grazed here. Rotational and deferred grazing systems along with light stocking rates have contributed good range conditions with a static or slight upward trend. Only small (less than 50 total acres) areas, representing less than one percent of the area grazed, (sheep trailing/watering/bedding) showed heavy use. Humphrey Ranch is grazed June 1 to October 20.

Henninger soils are stable with desirable forb, shrub, and grass diversity. Range condition is fair. Utilization is light on forbs and grasses (Table 3). The 2009 field surveys (visual) found moderate to heavy use on browse. Early and late season deer and elk grazing may contribute to a downward trend on shrubs. Only small (less than 10 total acres) areas representing less than two percent of the area grazed (sheep trailing/watering/bedding) showed heavy use. Henninger Ranch is grazed June 25 to July 9 and August 31 to September 15.

East Summer Range (Toms Creek) soils are stable with a desirable diversity of forbs, shrubs, and grasses. Utilization is none to slight (Table 3). A rotational/deferred grazing system with rest one year in three and light stocking rates have developed good range conditions with a stable or upward trend. Only small (less than 50 total acres) areas representing less than one percent of the area grazed (sheep driveways/trailing/watering/bedding) showed heavy use. East Summer range is grazed July 23 to August 31.

West Summer Range (Odell/Big Mountain) soils are stable, desirable diversity of forbs, shrubs, and grasses. Utilization is none to slight (Table 3). A rotational/deferred grazing system with rest one year in three and light stocking rates have developed good range conditions with a stable or upward trend. Only small (less than 50 total acres) areas representing less than one percent of the area grazed (sheep driveway/trailing/watering/bedding) showed heavy use. West Summer range is grazed July 9 to August 31.

1994 Headquarters Property Surveys

In 1994 NRCS (Natural Resource Conservation Service) range conservationists conducted a field inventory on ARS Headquarters property to evaluate ecological site status or range condition of stratified 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 (USDA 2005).

Range site or ecological site descriptions represent 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 plant communities 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 on ARS Headquarters property (NRCS 1995). The range site or ecological status evaluation determined that one percent of the sites sampled were in excellent condition, 63 percent in 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 seeded areas. Headquarters administrative site and feedlots were not inventoried for ecological status.

During the inventory process apparent trend was determined 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 or static site was seeded area, not evaluated.

1991 Summer Range Surveys

In 1991 a team of SCS (name changed to NRCS) range conservationists conducted a field inventory on ARS Summer Range property to evaluate ecological status or range condition of the plant communities.

Summer range lands were type mapped by ecological range site description for each natural potential 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 for percent canopy cover for grasses and grass like plants, forbs, cryptogams, shrubs and trees. Percent cover range was recorded for each grass and grass like species, forb species, shrubs and tree species, lichens and moss groups.

The 1991 inventory collected data to established relative range conditions on eight natural potential plant communities (range site descriptions) on ARS summer range was compiled and peer reviewed in 1992 (SCS 1992). The range site or ecological status was determined from field inventory worksheets for each specific site location. Site condition findings for each potential plant community include:

- South Slope Gravelly range site, good condition
- Mountain Meadow Loamy range site, good condition with one study point in excellent condition
- Windswept Mountain Ridge site, good condition
- Mountain Meadow Semiwet range site, excellent condition
- Mountain South Slope range site, predominantly in good condition with one study point in fair condition
- Steep Mountain Slope range site, predominantly in excellent condition with two study points in good condition and one in fair condition
- Mountain Slope range site, predominantly in good condition with one study point in excellent condition
- Riparian Wet Meadow range site, was in excellent condition

1989 Headquarters Property Surveys

In 1989 a team of SCS 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 (low to high) was recorded for each grass and grass like species, forb species, shrubs and tree species, lichens and moss group. Ecological site descriptions based on potential climax plant community, included range site production (AUMs), with stocking rates for excellent, good, fair and poor ratings and recommended grazing periods (SCS 1991).

As noted above, in 1994, 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.

The 1989 plant community 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 in good condition with one site in excellent condition. Shallow Stony sites conditions were rated ½ good and ½ fair, and Loamy Bottom sites were in good condition.

1997 Klement Research

Range surveys were conducted, and data was collected and analyzed on ARS 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 range conditions with static trend. 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 directed at tall forb, open conifer, and grass vegetation types. In 1989 rotational and deferred grazing systems were implemented. Light stocking rates use 6.25 percent of available forage, this has allowed low seral sites to improve since 1959 (Klements 1997). Three exclosure 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).

2008 Klement and Moffet Study

In 1994, 25 perennial tall forb community sites were sampled, including three with grazing exclosures. These vegetation types were also survey 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).

Bork 1997, long term fall (1924) and spring grazing study at Sheep Station, with old exclosures established in 1940s and new exclosures established in 1950 indicated sheep grazing cessation did not promote herb recovery any more than continued fall grazing (Bork 1997).

Conclusion

Surveys conducted on ARS properties in 2009, 1994, 1991, 1989 and grazing effects studies indicate ecological sites are in good condition, functioning properly, with appropriate species composition.

Introduction, Background and Regulatory Framework

The purpose of the rangeland resource report is to provide an analysis of the rangeland resource and respond to the Settlement Agreement (12-21-07) reached in the lawsuit the 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. The rangeland resource report will become part of the resource record and information contained within will support the National Environmental Policy Act (NEPA) documentation described in the settlement agreement.

The settlement agreement requires 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 sheep grazing and related activities on U.S. Sheep Experiment Station lands. The associated Decision Notice or Record of Decision shall be completed and signed on or before November 28, 2008.

2. The U.S. Agricultural Research Service shall consult with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act regarding sheep grazing and related activities on U.S. Sheep Experiment Station lands. The U.S. Agricultural Research Service agrees to work with the U.S. Fish and Wildlife Service in a good faith effort to complete the consultation by the date that the associated Decision Notice or Record of Decision is completed.

To meet the intent of the settlement agreement, the Sheep Station used a two-phased approach.

The first phase included an environmental assessment (Interim USSES Grazing and Association Activities Project (http://www.ars.usda.gov/SP2UserFiles/Place/53640000/20081126-ARS-USSES-EA.pdf)) and was limited to:

- The sheep grazing and associated activities on ARS Sheep Station lands that have historically occurred and are ongoing in support of research projects currently being conducted.
- The time necessary (through March 2010) to complete an environmental analysis (Phase 2) to consider the long-term effects of sheep grazing and associated activities needed to facilitate research at the Sheep Station.

On August 12, 2008, a Scoping package explaining the purpose and need for action, as well as the location and types of proposed activities, was mailed to approximately 100 interested parties. These included individuals and organizations who expressed interest in the project, adjacent landowners, public legislators (federal, state), township supervisors, and plaintiffs 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. Nineteen (19) responses to Scoping were received. Comments received during the public Scoping period were used to develop issues. Of the issues identified during Scoping none were unresolved. Therefore, no additional alternatives to the proposed action were analyzed in detail. Four additional alternatives were considered for that project but were eliminated from detailed analysis.

The Decision Notice, Finding of No Significant Impact, and Environmental Assessment for the Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project were signed on November 28, 2008.

The Phase 1 Interim USSES Grazing and Association Activities Project EA and associated project file are incorporated by reference for this analysis.

This rangeland resource report is incorporated as a portion of the Phase 2, environmental analysis that assesses long-term effects of sheep grazing and associated activities on ARS lands that have historically occurred and are ongoing in support of the Sheep Station research projects at Dubois, Idaho.

History

Establishment of the 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 Dubois Sheep Station was established in 1915. The Bureau of Animal Industry secured authorization to search for a tract of land in the west that could be used as range for a western sheep breeding experiment station. The Dubois location, approximately 28,000 acres, was selected, because it containing a solid block of public domain land of sufficient acreage adjacent to a railroad (McWhorter 1952). The U.S. Sheep Experiment Station (Sheep 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 ARS Sheep Station lands, which rests solely with the Secretary of Agriculture and the purpose of ARS lands, which are designated for "agricultural experiment purposes." There are no detailed records of land use prior to the Sheep Station establishment. Livestock grazing research under the ARS ownership, which dates from the 1900s, predates the county.

Addition of Summer Range

Summer rangeland in the Centennial Mountains was acquired to provide the natural resource base for sheep and grazing research. Between 1940 and 1942, ARS purchased the Humphrey and Henninger Ranches from the private sector. Prior to purchase, the Humphrey and Henninger Ranches were used for farming, some crop land, hay, for livestock production. Before transfer to the ARS, Henninger was grazed at heavier rates than currently used by the Sheep Station.

Research at the Sheep Station, Dubois, Idaho

Since its research began, circa 1918, the Sheep Station is credited with developing three breeds of sheep (i.e., Columbia, Targhee, and Polypay) and has 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 the Sheep Station has been ongoing since the 1930s, and the research has produced unmatched information on managing grazing on sagebrush steppe to preserve native ecosystems.

Current Sheep Station 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.

Sheep Station research involves at least 34 scientists at nine ARS locations in seven states and 10 universities in seven states, in addition to the scientists at the Sheep Station. Most of the research spans multiple years, and some of the long-term sheep genetics and rangeland research spans more than seven decades. In many cases, the Sheep Station has been the only location in North America with the land and animal resources to conduct the research, and the only location in North America able to establish direct linkages between new research and research conducted during the last 90 years to provide a clear understanding of the long-term consequences of various management strategies. Sheep Station 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.

Sheep Station 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;
- Preserve or improve rangeland ecosystems; and
- Preserve or improve wildlife habitat.

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

The Dubois United States Sheep Experiment Station (Sheep Station) is the only station in the USA conducting research with sheep in open range, high elevation extensive management systems. Research is done to develop animals with fitness traits or genetics suited to these extensive range conditions. The purposed of this research is to develop animals with genetics adapted to the high elevation environment.

Proposed Action

The United States Department of Agriculture (USDA), Agricultural Research Service (ARS) United States Sheep Experiment Station (Sheep Station) is made up of four major properties; Headquarters, Humphrey, Henninger, and Summer Range. In addition to the ARS administered lands that are grazed, the Sheep Station has Memoranda of Understanding (MOU) with other agencies to graze specific allotments. These grazing allotments cover lands managed by the Bureau of Land Management (BLM), Forest Service (USFS), and the Department of Energy (DOE). Grazing activities and effects on the BLM, and USFS grazing allotments, and DOE Feedlot are covered under separate agreements (MOU) with each respective agency. The grazing allotments by agency include; USFS: Snakey – Kelly, East Beaver, and Meyers Creek Allotments, BLM: Bernice Allotment. The DOE land is used as a feedlot with limited

grazing; it is called Mud Lake Feedlot. Mud Lake Feedlot facilities are used when sheep are not on grazing lands. Table 1 displays acres for each property.

Table 1. Summary of grazing areas

Property	Acres
Agricultural Research Service (ARS)	
Headquarters	27,930
Humphrey	2,600
Henninger	1,200
West Summer	11,874
East Summer	3,976
Allotments under MOU (USDA-FS, DOI-BLM, DOE)	
Snakey-Kelly (FS)	5,819
East Beaver (FS)	20,786
Meyers Creek (FS)	3,503
Bernice (BLM)	22,181
Mud Lake Feedlot (DOE)	766

Operations

The Sheep Station currently has approximately 3,300 mature sheep, plus attendant lambs. 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. The Sheep Station sheep harvest most of their feed through grazing. Sheep numbers are kept below range carrying capacity to maintain favorable range conditions.

Operations include traditional and on-going activities associated with sheep grazing research. In addition to ARS lands, National Forest (Snakey, Kelly, East Beaver, and Meyers Creek Allotments), Bureau of Land Management (Bernice Allotment), and Department of Energy (Mud Lake Feedlot) are also used for sheep research and grazing operations. When not being grazed, the sheep are maintained at the Mud Lake feedlot facility and in the feedlot facilities at Sheep Station Headquarters (where lambs are born). Mud Lake facilities include sheep pens, water stations, feed storage facilities, feed mixing and delivery equipment, tractors to power feed mixing and delivery equipment, and pen cleaning equipment. Harvested feeds (e.g., alfalfa hay, barley straw, small grains, corn, and various co products) are used to formulate balanced diets for sheep when they are in the Mud Lake feedlot (Moffet, 2008).

Sheep Grazing

Sheep graze across the landscape on a seasonal basis. Sheep numbers used to determine AUMs are based on a 10-year sheep inventory high of 3,331 head. Table 2 displays grazing areas utilized by sheep throughout a typical season. Sheep numbers in Table 2 are rounded to 3300, dates on and off each grazing area are average dates to display possible variations from year to year depending on weather and forage conditions.

Table 2. Proposed Action general sheep movement schedule

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
Mid-Late January - Late April to Early May	3300 sheep are maintained at Mud Lake feedlot facility under MOU from DOE and in the feedlot facilities at Sheep Station headquarters (lambs are born at this time of year)	Yes / No
Late April to Early May	3300 sheep are turned out to graze on ARS Sheep Station headquarters lands in Idaho	Yes
Late April/Early May - Late June	3300 sheep Grazing on ARS Sheep Station headquarters lands in Idaho	Yes
Early June - Early Sept	2000 sheep are moved from ARS Sheep Station headquarters lands in Idaho to ARS lands at the Henninger Ranch property in Idaho (this move is a transition between the spring and summer feeding grounds) [a]	Yes
	650 sheep are moved from ARS Sheep Station headquarters lands to graze on ARS lands at the Humphrey Ranch property in Idaho (this move is a transition between the spring and summer feeding grounds; 250 ewes with lambs and 400 rams)	
Early July to Early Sept	650 sheep are moved from ARS Sheep Station headquarters lands in Idaho to East Beaver FS allotment	
Late June – Early July	2000 sheep moved to graze on Henninger	Yes
Early July - Early Sept	600 sheep herded across the Forest Service Meyers Creek allotment to summer grazing on East Summer Range, ARS lands in Montana -	Yes / No
	600 sheep (average number/year) moved from Henninger Ranch to Meyers and East Summer Range, (900 sheep two out of three years)	
	1400 sheep herded from the Henninger Ranch to summer grazing in the Odell Creek and Big Mountain areas of ARS lands in Montana. Each year two of the three following scenarios are followed: 1) two out of three years one group of sheep herded across FS Meyers Creek Allotment to summer graze in Toms Creek, ARS lands in Montana. 2) one group of sheep herded from Henninger Ranch to summer graze in Odell Creek area. 3) A group of sheep herded from Henninger Ranch are summer grazed in Big Mountain area of the West Summer Range. -	
	1400 (average sheep numbers/year or 1100 two out of three years) sheep either at Odell or Big Mt, two out of three years, third year all 2,000 sheep are trailed to Odell and W Summer; no sheep to Meyers and E Summer	
	650 Sheep are moved from HDQ to East Beaver	
Early Sept – Mid Sept	2000 sheep from E and W Summer Range/Meyers move to Henninger	Yes/No
Mid Sept	2000 sheep move from Henninger to HDQ	Yes
	650 sheep from E. Beaver; 250 from Humphrey, (400 rams remain at Humphrey) move to HDQ	Yes
Mid Oct – Mid Nov	400 rams moved from Humphrey to HDQ	
Mid Oct	3300 sheep at HDQ	
Mid-October - Mid Nov	3300 Sheep are moved and maintained at the Mud Lake feedlot facility under MOU from DOE (this is when the ewes are mated)	
Mid Nov	2100 sheep are moved from Mud Lake to Snakey and Kelly, FS allotments. 400 Rams and 800 ewe lambs are retained at Mud Lake. [e]	No

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
Early November - Mid-Dec (based on allotment dates and or weather conditions)	2100 Sheep graze on Snakey and Kelly FS allotments	No
	1100 sheep graze on Snakey [b] 1000 sheep graze on Kelly [c]	
Late Nov - Mid Dec (based on allotment dates and weather conditions)	2100 Sheep are moved from Snakey and Kelly allotments to graze on BLM Bernice allotment [d]	No
Late Nov / Early February -	2100 sheep graze on Bernice allotment	No
Late Jan – Early Feb [f]	2100 sheep are moved to Mud Lake from Bernice allotment	No

a - Rams are not with ewes and lambs (2900 ewes and about 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 sheep are moved out of Snakey/Kelly is based on weather conditions, if there is early snow accumulation move out dates are 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 are 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 3, forage use and grazing dates are based on calculations using the best available plant productivity estimates and the high from the last 10 year 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 2. 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 2.

Table 3. Proposed Action: annual AUM[a] utilized per property within approximate[b] dates, based on 3,331 sheep[c] (Taylor. personal communication. USSES. 8/29/09)

Properties	AUM Available	AUM Utilized	Utilization Percent	Approximate Grazing Dates
Agricultural Research Service (ARS)	48,667	3,311	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
Summer East (Toms Creek)	4,043	155	3.8 %	July 23 – August 31
Summer West (Odell Creek/ Big Mountain)	9,881	500	5.1 %	July 9 – August 31
Allotments under MOUs (DOE, USDA-FS, DOI-BLM)	26,087	1,516	5.8 %	
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	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) sheep[c] 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). Sheep numbers are rounded, for more specific sheep numbers see flow charts and spreadsheets in Project File.

Sheep Transportation by Truck

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 National Forest and Bureau of Land Management allotments.

There are permanent corrals and loading chutes at Headquarters, Mud Lake, Humphrey, and Henninger. At Snakey-Kelly Forest Service allotment, sheep are unloaded on National Forest Road 202. On Bernice BLM 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.

Table 4. Number of sheep trucked from Headquarters in and out each year for each range area and allotment

Property	Sheep
Humphrey	1300
Winter Range (FS & BLM Allotments)	2100 (± 100 depending on year)
Mud Lake (DOE)	3,300 (± at shearing and breeding time)

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 5 displays sheep trails used by the Sheep Station annually. Sheep trail routes are shown on map 3 in Appendix A of the EIS.

Table 5. 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 to FS and BLM allotments 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[1]

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 Map 22 (East Summer Range) and Map 23 (West Summer Range) in appendix A of the EIS.

Figure 1. Sheep driveway, Odell Creek (point OD5 on field map – jf 08/07/08)

There are no sheep driveways on low elevation pastures, the only maintained 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. 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 ½ 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, no longer needed or used, are closed and rehabilitated; seeded with native species, brush or woody debris if available returned to the site, and animals are kept off to restore the area.

Table 6. Sheep numbers trailed on pastures as an average of last five years

Driveway	Length	Use Time	Horse	Ewes	Lambs
Summer West Pasture					
Skyline Unit - used twice a year	~1 mile	~2 hours	2	785	1,165
Odell Unit 6 - usually used once a year	~1/8 mile	~1 hour	2	785	1,165
Odell Unit 4 - usually used twice a year	~1/8 mile	~½ hour	1	785	1,165
Little Odell - used once a year	~¼ mile	~1 hour	1	785	1,165
Big Odell -- used once a year	~¼ mile	~1 hour	1	785	1,165
Big Mountain - generally used only once a year	~½ mile	~1 ½ hours	2	782	1,157
Corrals to Top - usually used 4 times a year	~½ mile	~1 ½ hours	2	782	1,157
Canyon Unit – used once or twice a year	~¼ mile	~45 minutes	2	782	1,157
Summer East Pasture					
Toms Units 5 & 6 – used once or twice a year	~½ mile	~1 ½ hours	1	838	1,273
Toms Units 6 & 7 - used once or less a year	~½ mile	~2 hours	1	838	1,273

[1] 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

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 large areas in open terrain and moved slowly while grazing to reduce adverse effects on travel routes.

Driveways are used only on years the pastures in the area are grazed, 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 ARS 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 number of sheep to water; up to 25 troughs may be used for large bands, two troughs are adequate where a small number (50 to 60 head) of 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. Six to eight groups graze at the same time so that six to eight sites could be used at any given time. Watering sites are used for three to seven days and then moved. 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 pastures have surface water available for sheep and horses with developed sites on Big Mountain pasture described below.

Water Developments

Humphrey and Henninger

Humphrey and Henninger Ranches have developed ditches (Figure 2) to divert water onto grazing pastures while sheep are grazing the areas. Flood irrigation water is used to water sheep. Irrigation ditch locations and flood irrigated areas located on Henninger and Humphrey Ranches are shown on maps 11 and 12 in Appendix A of the EIS. Henninger and Humphrey Ranches were working ranches, purchased from the private sector in the 1940s. Irrigation practices were ongoing before ARS purchased the properties. Water is diverted, from Modoc Creek at Humphrey and from West Dry Creek at Henninger, with canvas dams, into diversion ditches to flood pastures at the time sheep graze in the area. 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 and irrigation provides more green forage longer during the dry season. Number of days water is applied varies from one year to next depending on needs and water availability. When sheep are moved out of the pasture water diversion canvas dams are removed, diversion is shut off. There are about two miles of irrigation ditch at each ranch. Humphrey ranch has water rights for from May 1 to October 15. The Humphrey pastures are grazed from May to October. Henninger Ranch has water use rights from May 1 to October 31. Spring water use is not allowed until the water flow in Dry Creek no longer reaches Spring Creek in mid to late June. Diversion ditches are inspected and maintained annually.

Figure 2. Henninger ditch maintenance (jf)

West Summer Range

Water development (Figure 3) sites located on the West Summer Range are shown on Map 23 in Appendix A of the EIS. 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. Water developments are also used by wildlife.

Figure 3. 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 or wood 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 shown on Map 23 in appendix A of the EIS 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

- Continue cleaning existing ditches with ditching tool.
- Install two new Weir Boxes on Modoc Creek on National Forest lands to improve water measurement.

Henninger

- Continue cleaning existing ditches with ditching tool.
- Install new concrete diversion head gate on National Forest System lands (after approval by USFS). USFS will do NEPA analysis on this head gate project. The new head gate will allow better measurement of water usage and less erosion problems with the ditch.

Summer Range

- Replace two existing wooden water developments with metal structures.

- Continue annual spring cleaning water sources.

Camp Tending

Sheep Herding Camps

Headquarters, Humphrey and Henninger Camps

Figure 4.Camp herder trailer (sw 05/08)

Low elevation pastures 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 4) 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 low elevation pastures are visited by a camp tender at two-day intervals to resupply, remove trash or any other tending needs. Crested wheatgrass provides the primary ground cover at the ¼ acre or less campsites where camp activities remove or trample sagebrush and other vegetation. Total area affected by campsites is a very small or is a negligible percent of the total pasture area.

Summer Range Camps

Summer camps include a seven foot by seven-foot teepee tent, no trough, horses are watered at natural water sites, one horse is picketed, and one horse is loose. Camp areas affect about a 50-foot radius, 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 ARS Headquarters for proper disposal in a dumpster that is emptied at a legal landfill. Table 7 shows the number of camps in each summer pasture and season used.

Table 7. 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 property, Humphrey, and Henninger Ranches. All fences are inspected and repaired annually. Fences are constructed with three feet or four

feet high woven wire and one or two barbed wire strands above the woven wire. Fence locations, including exclosures, are shown on each ARS pasture area map in appendix A of the EIS. Fence types are shown in each map legend.

Pasture Fences

Sheep proof fences at Headquarters, Humphrey, and Henninger are maintained to confine sheep.

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 (EIS Appendix A, 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 fences are let down each year after grazing operations are complete.

Exclosures

Exclosures were established in the 1940s, 1960 and 1978. 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 one-half acre.

Coyote-sheep Interaction Research Fence

An eight-foot high coyote proof fence is maintained at Headquarters (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.

Schedule of proposed fence maintenance activities though 2014

Figure 5. Example of coyote-proof fencing on Headquarters - (sw 05/08)

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
- 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 at same location
- Continue clean-up of old nonfunctional fence lines and equipment

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 exclosures with new posts and wire)

Maintenance and repair of existing roads and fire breaks

Roads

Figure 6. 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 6 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.

Schedule of proposed road work activities through 2014

Headquarters

- Annual road maintenance (pulling up the shoulders and smoothing out potholes). Any replacement gravel is hauled in from the State of Idaho gravel pits.
- Remove, clean, repair and reinstall six existing cattle guards
- Replace two existing culverts in the feedlots to control spring runoff

Henninger

- Continue to lightly grade existing roads where needed

Firebreaks

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.

Figure 7. Cleared firebreak –fy 2008

Prescribed burn firebreaks are constructed with a dozer and motor grader. Burn unit firebreak lines (Figure 7) and blackline firebreaks (Figure 8) 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. Fire breaks not needed for motorized access for research are rehabilitated. Shrub and grass debris removed from firebreaks 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 8. Blackline – fy 2008

Firebreaks around prescribed burn areas are not maintained. They are not seeded and are left to revegetate with native species. 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 at these environmental conditions. A study of cheatgrass encroachment is continuing on the 2005 Hitching-Post Burn at Headquarters property in parts of sections 5, 6, 7 and 8 T11N, R37E (Taylor 2008).

Range Improvement

Prescribed Burning

Prescribed burning, to improve range land conditions and restore fire to the landscape, has been conducted on ARS land since 1936. ARS plans to burn Headquarters pasture areas on a 30 year rotation, this would equal about 900 acres each year, actual burn area has been less than the planned 30 year rotation average acres. Burn records show the following acres burned:

- Past 30 years, 1978 to 2007; 5,400 acre prescribed burn and 13,867 acres wildfire
- Past 10 years, 1998 to 2007; 2,672 acres prescribed burn and 1,208 acres wildfire

Total area burned with wildfire and prescribed fire in past 40 years is 23,147 or an average 580 acres/year. The Headquarters Prescribed Burn (Map 16 appendix A, EIS) displays prescribed burn areas and years burned. Headquarters Wildfire History (Map 14 appendix A, EIS) displays wildfires and year burned. In the past 30 years, burns have been done primarily in fall, with minor amounts of spring and late summer burning. Wildfire burn areas are evaluated and included when planning prescribed burns. Burning is conducted, on about 200 acre average size units, primarily in spring and fall. Burning, for research to improve forage production benefits wildlife habitat by providing a mosaic of burned and unburned sites. Burn effects research has been the main objective of prescribed burns after 1990. Prior to 1990 burning was done to increase forage production and improve range conditions. Burn research, to determine species composition, range health and productivity, dates back to 1936. Research with statistically valid replicated plots of unburned areas is done within the larger fire area. Burning is done to simulate wildfire frequency and approximate natural fire cycles with a burned-unburned mosaic. Prescribed burn research includes effects on vegetation recovery with sheep grazing, before and after the burn, on rangeland ecosystems.

Studies indicate mountain big sage (*Artimisia tridentate*), the most common sagebrush in southwest Montana, will recover from fire on average in 32 years. Wyoming big sage (*A. wyomingensis*) takes much longer to recover. Prescribed fire followed by light grazing may be a way to rejuvenate mountain big sage stands. On average, prescribed burn benefits would persist until sagebrush canopy has recovered in about 30 years (Lesica 2005).

Burns are designed to consume 95 percent of the vegetation. Remote sensing is used to evaluate fire intensity and to determine if objectives have been met. The main adverse effect of burning is temporary loss of vegetation and ground cover litter for soil protection. Within two years, after burning, forb and grass cover returns to replace pre-burn shrubs. Shrub cover returns and again replaces grass and forbs after several decades. Current burn effects monitoring is being done to determine wind caused soil transport on burn areas (Moffet 2008).

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 is 474 acres, plus 29 acres of black line burn. Burn unit locations are shown on ARS-Headquarters Prescribed Fire History (Map 16 appendix A, EIS).

An 11,803 acre landscape area has been identified for future burn opportunities. About 2000 acres within the identified area would be burned in the next five years (2015), an average 400 acres/year. ARS-Headquarters Prescribed Fire History (Map 16 appendix A, EIS) 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, Appendix 4: Statement of Work – Prescribed Burns – Dubois, Idaho 2008).

Seeding

Crested wheatgrass was planted on Dubois ARS lands about 1940 (National Wool Growers, 1947 and 1948, photo of planting results is dated 8-22-1941). Plantings were at 5,800 feet elevation with 12 inch precipitation. Plantings produced forage for eight sheep months/acre. Large areas were planted with wheatgrass on Headquarters property in 1960s (Jacobson 09/2009 personal communication).

Recent plantings include 52 acres of the 2001 burn area at Headquarters with a mixture of native and introduced species in April 2002. Fifty-two acres of forage kochia, bitterbrush, and crested wheatgrass planting are planned for 2011. Various forage kochia varieties are planned for planting on 240 acres in 2014.

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

Occasional reseeding has been done on Humphrey Ranch, 11 acres were reseeded in 2005, and 20 acres were seeded about 1988. Forty-eight acres of the 2000 wildfire burn area were seeded in spring 2001. A native seed mix, an introduced mix, and a mix with natives and introduced species were applied to test results.

Eleven and one half acres were planted to spring wheat at Humphrey in 2008, eleven and one half acres were planted to triticale in 2009. Eight acres are planned for seeding at Humphrey in 2010 and nine acres are planned for 2011. Specific acres and planned species to be planted are included in the project file.

Eighteen acres on the Big Mountain grazing Area, (West Summer Range mine disturbed site), were seeded with a mix of Luna pubescent wheatgrass, Tekmar/Rush intermediate wheatgrass, Covar sheep fescue, and yellow sweet clover in 2002, this planting failed.

The 1994 ecological status, range condition field survey, inventory conducted by NRCS conservationists on ARS Headquarters property indicated three percent of the Headquarters property area was occupied by non-native species, primarily planted crested wheatgrass (NRCS 1994).

Complete seeding records are available at the Dubois Headquarters range office.

The following seeding activities are proposed for the Headquarters and Humphrey properties within the next five years (Map 18 and Map 21 appendix A, EIS):

- 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 seeded 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 forage (dormant vegetation) needed to be removed. Excess forage is primarily fine fuels and standing dead plants, primarily grasses. ARS goals for removing excess forage are to reduce the fine-fuel load on the land and remove standing dead plants to make new growth more accessible and reduce wildfire risk. Cattle and horse grazing commences in early winter after forage growth has ceased for the year and when plants are dormant. Cattle and horses do not graze plants during the growing season (vegetative phase). Cattle and horses are grazed only about 30 days, between November 1 and January 1, in years when cattle or horse grazing is used (Lewis 2011 personal communication).

No cattle were grazed in 2006 due to drought conditions. Cattle are primarily used with limited horse grazing in past. 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 Station. Table 8 displays average AUMs from 1997 to 2008 for each property (Moffet 2009 personal communication).

Table 8. 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, personal communication 2008). Pasture size, number of animals grazed and number of days grazed by year on each pasture are included in appendix B of this report. Table 9 displays cattle and horse AUMs used from 1997 to 2010 for Headquarters property, Humphrey and Henninger ranches.

Table 9. 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

Large predators have not been a problem with sheep grazing on ARS lands. Sheep are moved, when large carnivores enter the current grazing area, to avoid conflict. USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services and US Fish and Wildlife Service is contacted and used to manage wolf, bear, or mountain lion encounters. Sheep Station staff or Wildlife Services are used to remove problem coyotes. Records indicate few large carnivore encounters in the past. Predator avoidance and abatement details are covered in the wildlife report (Kozlowski 2011).

Integrated Pest Management

Noxious Weeds

There are few weed problems on ARS pasture lands. The main areas of weed infestations are located in sheep pens and along roads. Some weed species are present on adjacent lands, and over time, adjacent weeds invade ARS lands. Invasive plant species infestations on ARS lands are GPS (Global Positioning System) mapped for control actions.

ARS uses 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 potential spread with sheep grazing. This integrated, primary weed control, approach includes the use of strategic sheep grazing as a biocontrol method to reduce the production of weed seed and the spread of weeds. Specific beetle species, alone or in combination with other biocontrol methods, are also used.

In 1994 NRCS range conservationists conducted a field inventory on ARS Headquarters property to evaluate ecological status or range condition of the plant communities. Of 162 field study plots, cheatgrass was present on 38 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. Cheatgrass was present on 23 percent of the total survey plots, 87 percent of the plots with cheatgrass had 3 percent or less cheatgrass cover.

On the 2009 Headquarters range survey line intercept transects, cheatgrass occurrence was less than one percent on five line transects. No cheatgrass was present on Humphrey, Henninger, or summer range transects. Table 10 displays cheatgrass and crested wheatgrass presence on the 2009 Headquarters survey transects.

Table 10. Cheatgrass percent cover

Transect No.	Cheatgrass Percentage cover
HQ 1	< 1
HQ 2	< 1
HQ 3	0.3
HQ 4	0.7
HQ 5	0
HQ 6	0
HQ 7	0

Precautions are taken by ARS to minimize weed spread from sheep. To accomplish this, areas with weeds are grazed in spring when there is little or no risk of spreading weed seeds. ARS also quarantines animals for six days before moving sheep from weed infested areas or from feed with potential weed seeds to other grazing units. ARS does not graze areas when weed seeds are developed and there is risk of spreading seeds to another area.

Leafy spurge flea beetles have been used to control leafy spurge on ARS lands. *Aphthona* spp. consume only a narrow range of plants, all of which are in the spurge family. Leafy spurge flea beetle species are introduced biological control agents. Black (*Aphthona lacertosa* and *Aphthona czwalinae*) and brown (*Aphthona nigriscutis*) flea beetles are among the more successful biological control agents used in the control and management of leafy spurge on a relatively large scale in the Northern Great Plains. In July

2004 The Continental Divide Cooperative Weed Management Area group provided beetles for transplanting onto ARS property to control leafy spurge. Both of these small flea beetle insects, *Aphthona nigriscutis* and *Aphthona lacertosa* larvae feed on the fine roots of leafy spurge. Adults feed on plant foliage. The beetles were acquired from Forest Service insectaries, which are located approximately 7.5 miles north of the Sheep Station, along Beaver Creek and Peppermint Creek. Beetles were transplanted onto ARS property, among existing populations of beetles, along Beaver Creek between I-15 and the Old Butte Highway. Existing populations of beetles migrated to ARS property from non-ARS lands where they were originally released (Lewis 2011).

Since 2002, this is the only biocontrol insect transplant. Leafy spurge flea beetles may have been transplanted onto ARS property before 2002, but there is no known record.

No insects have been transplanted onto ARS properties to control spotted knapweed. However, there are at least four biocontrol insects present. These insects have migrated to ARS properties from non-ARS lands where they were originally released.

Herbicide application is used minimally on invasive weed species that are not consumed by sheep. Herbicides have been used annually to control weeds along roadsides, in feedlots and corrals, small pastures (< 10 ha), and near buildings for about 30 years. Herbicide 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.

Vegetation monitoring is conducted before and after grazing, which includes annual measurements of invasive weeds, native plant density, occurrence frequency, along with collecting annual or biannual aerial (100 to 200 m above-ground-level) and on-the-ground (1 to 2 m) digital imagery of grazed and non-grazed areas. Post treatment monitoring is conducted with site visits at five year intervals. A description, target species and example of USSES noxious weed strategy is included in Appendix 2 of the Interim U.S. Sheep Experiment Station Grazing and Associated Activities Project EA. Herbicide effects are included in the hydrology report (Fryxell 2011).

Mitigation Measures

Grizzly Bear

The wildlife report is hereby incorporated by reference. Mitigation measures include:

- Minimize the availability of all unnatural attractants to bears. These include livestock carcasses, human foods, garbage, and dog food.
- Consider potential livestock-bear conflicts when creating research plans that include a sheep grazing component, and avoid areas with anticipated problems.
- Use good husbandry practices so that sheep are healthy and suitable for research. ARS Institutional Animal Care and Use Committee evaluates all research protocols that include animals and all standard livestock management practices to assure compliance with Federal laws that govern use of agricultural animals in agricultural research. Assure standard management practices are consistent with good animal husbandry. Protocols and practices that do not comply are not approved, and animals cannot be used unless protocols and practices are in compliance.
- Based on arrangements between USDA, Agricultural Research Service and USDA, APHIS, Wildlife Services, when on Agricultural Research Service land report potential and existing bear activity and(or) conflicts to Wildlife Services. Wildlife Services then contacts whatever agencies should be contacted.
- When on USDA, Forest Service or on DOI, Bureau of Land Management land, ARS contact the Forest Service or Bureau of Land Management, respectively, and Wildlife Services. Wildlife Services handles wildlife issues on behalf of the Agricultural Research Service.
- When on Agricultural Research Service, Forest Service, and Bureau of Land Management land, use approved, “bear-proof” containers. Damaged containers are repaired or replaced so that they work as designed.
- Conduct at least two formal training-orientation meetings annually with Sheep Station employees to make sure they can identify black bear, grizzly bear, bighorn sheep, mountain lions, etc., understand Sheep Station sanitation and garbage removal practices, know how to use nonlethal methods to minimize livestock-wildlife interactions, who to contact and how to do it if they anticipate or experience a problem, and a variety of related issues.
- Training and education are ongoing and not limited to formal meetings.
- Keep herders, working dogs, and guard dogs with ARS sheep when they are on rangelands, and basically follow the “best management practices” that are listed in the file, entitled Bernice Snakey Kelly Allotment BMPs 7-14-2009.doc.

Sheep Driveway

At the sheep driveway crossing on Odell Creek in section 11, T15S, R2W there is bare soil, 10 feet wide for about 150 feet on the south side of the crossing, on 15 to 20 percent slope. To divert overland flow and prevent soil transport into Odell Creek, cross drains would be constructed on the driveway trail. Place three 10 to 12 inch diameter logs (available in the adjacent timber stand) angle imbedded three inches deep across the trail to divert runoff into undisturbed areas with existing vegetation ground cover and

down woody debris. The three cross drains would be placed 40 to 50 feet apart, at sites where the trail grade is less than 10 percent, for efficient cross drain function and to minimize maintenance needs. Cross drains would also be constructed on the narrow trail further to the west. This trail segment is eroding into a washed out trench, cross drains would divert water off the trail and eliminate further down cutting. Cross drains would be monitored and maintained annually. 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.

At both Odell Creek crossings place water bars at key gradient breaks or embed 10-12" logs at these gradient breaks about 3-5 inches deep, depending on log size. Place logs or water bars at an angle of 20-45 degrees across the driveway to ensure water is diverted off these areas, into undisturbed vegetated forest floor, which will function as sediment filter strip.

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 streambanks) to prevent further degradation due to sheep crossing the stream.

Herbicide Application

- Follow all label directions for application
- Any herbicide application is limited to the minimum amount of active ingredient (pounds of active ingredient/acre) as analyzed in the current SERA. All guidelines and safety precautions would be followed in any application of chemical materials. By following all guidelines and safety procedures.

Heritage

To ensure protection for cultural resources (Heritage Report is hereby incorporated by reference):

- Review proposed undertakings with the State Historic Preservation Officers prior to implementation.
- 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.
- Develop a survey strategy and facilities management plan and schedule during the second stage of the NEPA analysis.

Affected Environment

The U.S. Department of Agriculture (USDA), Agricultural Research Service, U.S. Sheep Experiment 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, Sheep Station, Dubois station manages and grazes lands for research in Montana and Idaho. An overview of grazing areas is described below (also see appendix A Maps in the EIS).

Headquarters Range, 27,930 acres of ARS land, includes 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. 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 pastures, 16,600 acres of ARS land, in the Centennial Mountains of Montana, are used for summer grazing and rangeland research. 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. 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 land 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 land 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 (EIS Appendix A, Map 2) lands. 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.

Spatial and Temporal Context for the Effects Analysis

The spatial boundary for range effects analysis is all ARS Sheep Station lands. Cumulative effects analysis includes ARS lands 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.

Existing Condition

Headquarters Property (Figure 9)

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.

Figure 9. Headquarters pasture - (tg 08/09)

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.

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 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 1992a).

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 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 10)

Figure 10. Henninger Ranch pasture - (tg 08/09)

Henninger Ranch pastures fair range condition appears to be static with a down ward trend on browse species. This range 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 is supporting the 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 the ARS in the early 1940s. The presence of 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 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 11)

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.

Figure 11. Humphrey Ranch pasture - (tg 08/09)

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.

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 12)

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

Figure 12. 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 lands 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 13 to Figure 15 display grazing effects at fence-line at sheep exclosure in West Summer Range (Odell).

Figure 13. Fence-line along sheep exclosure

Figure 14. Same location away from exclosure

Figure 15. Same location inside exclosure - West Summer Odell Unit (grazed area) - (cj 08/09)

Figure 16. Driveway bottleneck West Summer - (cj 08/09)

Figure 16, 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 toe of slope (Figure 16). 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), none 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 17 to Figure 19).

Figure 17. West Summer Range, Odell. Upslope -Left side is ungrazed while right demonstrates herd grazing

Figure 18. West Summer Range, Odell. Down-slope – Note ungrazed areas bordering grazed/herded area

Figure 19. Grazed area exhibits minimal exposed soil and excellent residual litter - (cj 08/09)

Figure 20. Below area of concern Toms Creek – 8/09

Figure 21. Area of Concern Toms Creek – 8/09

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 20 and Figure 21 display the existing conditions for the area of concern in Toms Creek that was noted in Scoping comments. A diversity of plants and good production indicate that this area is recovering.

Range surveys were collected and analyzed on ARS 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 ARS, 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 ARS 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 lands 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 (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

Forest Vegetation Cover Types

Forest vegetation cover types on Henninger, Humphrey and Summer Range areas are not included as grazeable acres for sheep. Bark beetle activity is prevalent on much of the conifer timber types in Odell Creek. There are extensive areas of Englemenn spruce, lodgepole pine and whitebark pine mortality. Some Englemann spruce stands in Spring Creek are 70 percent dead. Casey with Mell Montgomery Outfitters, Lakeview, Montana, indicated there are extensive areas of whitebark pine on Baldy Mt with up to 80 percent dead with a high percent of recent, red needle, kill (Smith, personal communication 2008). Lodgepole pine, mountain pine beetle, mortality is common throughout the forest type. Mortality is also common in Englemann spruce in mixed conifer forest types and in dominant old growth Douglas-fir on south aspects in the lower Spring Creek Douglas-fir type. Patches of recent and older dead alpine fir occur on the north aspect in Spring Creek. Aspen stands appear healthy with vigorous regeneration and saplings in lower Spring Creek, indicating favorable conditions and low herbivore use.

Insect activity and tree diseases on West Summer Range (Odell Creek) area contributing to mortality include:

- Mountain pine beetle (*Dendroctonus ponderosae*) in lodgeploe pine and whitebark pine
- Spruce beetle (*Dendroctonus rufipennis*) in Englemann spruce
- Douglas-fir beetle (*Dendroctonus pseudatsugae*) in Douglas-fir
- Western balsam bark beetle (*Dryocoetes confuses*) is evident in alpine fir (subalpine fir).
- White pine blister rust (*Cronartium ribicola*) introduced to north America about 1910, is also causing whitebark pine mortality. Ribes (alternate host) is found on much of the Odell drainage
- Western spruce bud worm (*Choristoneura occidentalis*) is active in Douglas-fir and Englemann spruce at lower elevations just below the ARS land.
- Fir broom rust (*Melampsorella caryophyllacearum*) common in alpine fir overstory and understory trees on much of the area may be weakening and contributing to alpine fir mortality.
- Snow mold (*Herpotrichia nigra*), present on much of the timbered area with heavy infections in spots, is affecting understory lodgepole and whitebark pine.

Tree mortality in all stands will continue and add standing and down fuels to timbered areas. Lodgepole pine and Englemann spruce will fall to the forest floor, three to ten years after they are killed. Well stocked high mortality stands could accumulate up to 150 tons of dead fuel per acre.

Henninger Ranch forest type acres

- Aspen, 57
- Douglas-fir, 12
- Lodgepole Pine, 64

- Total forest type, 133 acres, 10.4 percent of Henninger total acres

East Summer Range forest type acres

- Aspen, 315
- Douglas-fir, 799
- Lodgepole Pine, 1373
- Mixed Lower Subalpine Conifer Forest, 167
- Mixed Upper Subalpine Conifer Forest, 124
- Subalpine Fir / Spruce, 116
- Whitbark pine, 14
- Total forest type, 2,908 acres, 73.1 percent of East Summer Range total acres

West Summer Range forest type acres

- Aspen, 392
- Douglas-fir, 5,749
- Lodgepole Pine, 747
- Mixed Lower Subalpine Conifer Forest,
- Mixed Upper Subalpine Conifer Forest, 443
- Subalpine Fir / Spruce, 62
- Whitebark pine, 308
- Total forest type, 7,701 acres, 64.9 percent of West Summer Range total acres

Sheep Station grazing operations would have no effect on whitebark pine habitat.

ARS has an MOU with the USDA Forest Service to manage wildland fire on Sheep Station summer range.

The MOU provides authority for and a basis for cooperation between the USSES and FS concerning management of wildland fire use events that may affect ARS lands. The agencies agree to cooperate with implementation of wildland fire use, wildland fire management activities and events, to achieve land management goals.

The agencies MOU agreement provides for cooperative arrangements to cover administrative and jurisdictional responsibilities that will provide for mutual assistance for managing wildland fires for resource benefits. When wildland fire use fires burn on, or threaten ARS lands, joint planning will be conducted by local officials of the representative agencies to manage wildland fires. The Forest Service will work closely with the Sheep Station to determine management objectives and strategies and will be the responsible agency for managing wildland fires (use fires) that ignite on or spread onto ARS lands.

These management objectives apply to all ARS summer range lands including whitebark pine forest types, aspen, Douglas-fir, mixed conifer and other timber types.

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 Agricultural Research Service rangelands.

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* (NRCS 1999), *Ecological Site Descriptions for Major Land Resource Area Bllb, Blla, B13* (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 rangelands. 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 11) 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 11. 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.

Climate Change

There are no regulations for ARS Sheep Station to limit greenhouse gas emissions from livestock operations. The current state of climate change science does not allow for site specific analysis of greenhouse gas emissions impacts at the local or regional level. Likewise, Global Climate Change models are not 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 effects of climate change on rangeland conditions, would be speculative and are therefore not included.

Environmental Consequences

Alternative descriptions below display the differences between alternatives 2 to 5 and the Proposed Action (alternative 1). Table 12 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 12. Grazing properties by alternative

Properties	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
ARS lands					
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

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. 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.

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

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 the Sheep Station 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 Sheep Station 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

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.

Continued 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

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 ARS 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 13 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 13. Alternative 1 – percent of forage used, grazing period and grazing days by property[c]

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 [d]	4,043	155	3.8	July 3 – Aug 31	60
West Summer [d]	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] - 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).
[d] - 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 U. S. Sheep Experiment Station to continue its mission of current and ongoing research.

Alternative 2 (No grazing Agricultural Research Service 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 lands 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 14 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.

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

Table 14. 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
Agricultural Research Service	**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	April 1 – September 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

Headquarters/Humphrey East Summer /West Summer

Grazing cessation 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. Prescribe burning would not be done to retain fire as an ecological process on the landscape (Headquarters) and invasive plants control would not continue.

No grazing across all Agricultural Research Service lands 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 lands. 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 Headquarters and Humphrey properties would not continue.

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

Henninger

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 lands would be used for after Sheep Station 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 U. S. Sheep Experiment Station to continue its current and ongoing research mission.

Alternative 3 (No grazing Agricultural Research Service Properties 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 is 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 15 displays alternative 3 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Table 15. Alternative 3 general sheep grazing schedule

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
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 MOU from DOE and in the feedlot facilities at ARS 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 ARS Sheep Station headquarters lands in Idaho	Yes
	2660 sheep	
Late April - Late May	2660 sheep Grazing on ARS Sheep Station headquarters lands in Idaho – 2660 sheep	Yes
Early June – Early Oct	2660 The sheep are moved from ARS Sheep Station headquarters lands in Idaho to ARS lands at 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

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
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	No
	900 sheep at Kelly allotment	
Mid Dec – Mid Jan	960 sheep at Mud Lake feedlots	No
	1680 sheep at Bernice BLM allotment	

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 aways 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 16 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 16. Alternative 3 - projected annual AUM utilization on each property[c] with approximate grazing dates

Properties	AUM[a] Available	AUM Utilized	Utilization %	Approximate[b] 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

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)

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. Higher forage use under alternative 3, could affect species composition. 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 off set 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

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 /East Summer/West Summer

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, no grazing on Humphrey Ranch and East and West Summer Ranges, would not provide conditions necessary for the U. S. Sheep Experiment Station 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 Sheep Station East Summer Range and USDA Forest Service 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 3,331head. The majority of AUMs needed to replace AUMs eliminated on East Summer Range would be provided from ARS Sheep Station West Summer Range.

Table 17 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 17. 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/Henninger

Same effects as alternative 1

East Summer

Same effects as alternative 2.

West Summer (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. Cessation of grazing on East Summer would result in grazing West Summer (Odell/Big Mountain) each year. Although rest rotation could be done 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 18 displays alternative 4 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Table 18. Alternative 4 general sheep grazing schedule

Dates	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
Mid-Late January - Late April to Early May	3300 Sheep are maintained at the Mud Lake feedlot facility under MOU from DOE and in the feedlot facilities at ARS Sheep Station 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 ARS Sheep Station headquarters lands in Idaho	Yes
Late April to Early May - Late June	3300 sheep graze on ARS Sheep Station headquarters lands 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 areas of USSES 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 ARS Sheep Station headquarters lands 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 MOU 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 [b] 1000 sheep to Kelly [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 from Bernice	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 aways 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

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, U. S. Sheep Experiment Station would not have suitable 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 horned sheep populations. AUMs used and 2,332 sheep retained for research are based on a 30 percent reduction from alternative 1 sheep inventory. Alternative 5, USDA Forest Service East Beaver and DOI-BLM Bernice allotments would not be grazed. 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 DOE lands 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 19 displays alternative 5 scheduled sheep grazing inclusive dates and sheep numbers for each property.

Table 19. Alternative 5 general sheep grazing schedule

Dates [a]	Activity (Grazing dates are approximate depending on range readiness)	ARS Lands
Early January - Late April	2330 sheep are maintained at the Mud Lake feedlot facility under MOU from DOE and in the feedlot facilities at ARS 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 ARS Sheep Station headquarters lands 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)

Table 20 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 20. 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
ARS Properties	**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
Allotments under MOUs (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

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

Headquarters/Humphrey/Henninger/East Summer/West Summer

There would be no change from alternative 1 effects.

Alternative 5 - Summary Range Direct/Indirect Effects

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

Range Cumulative Effects

The spatial boundary for range cumulative effects for this analysis includes ARS, Sheep Station properties (Headquarters, Humphrey, Henninger, East and West Summer Ranges) and allotments under MOUs with 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.

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.

East and West Summer Range lands 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 the 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 ARS Summer Range property to evaluate ecological status or range condition 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 ARS 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 between levels of grazing on the grazed and ungrazed areas surveyed in 1959, 1978, and 1994. Results indicated sheep grazing on ARS 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 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. Humphery 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 would not adversely affect the range resource.

Alternative 1 – Proposed Action

Mud Lake Feedlot

Mud Lake property 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 lands 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 feedlot grazing lands 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

Currently these allotments are lightly stocked with resulting light utilization. The grazing period is during the non-growing season (November – February) when plants are most resistant to grazing. Rest during the growing season allows plants to regrow. 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 not available for sheep grazing 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 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

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 21 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.

Table 21. 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.

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

Alternative 2 (No grazing Agricultural Research Service Properties and Bureau of Land Management/ Forest Service Allotments)

Mud Lake Feedlot

Grazing 158 AUMs during the growing season (April thru September) on lands 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

Grazing cessation 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 these lands without current control efforts implemented by Sheep Station.

East Beaver Allotment

Sheep grazing cessation 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 22 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 22. 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

Elimination of grazing on ARS properties as well as Bureau of Land Management and Forest Service (National Forest lands) allotments would not provide range conditions necessary for the U. S. Sheep Experiment Station to continue its current and ongoing research mission.

Alternative 3 (No grazing Agricultural Research Service Properties 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

Loss of East Beaver and Meyers Creek allotments for sheep grazing would eliminate ARS 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 23 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 23. 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, the unavailability of Humphrey Ranch and the East and West Summer Ranges and East Beaver and Meyers Creek allotments for grazing would not provide range conditions necessary for the U. S. Sheep Experiment 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 other 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 24 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 24. 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, the unavailability of East Summer Ranges and Meyers Creek allotment for grazing would not provide range conditions necessary for the Sheep Station to continue its current and ongoing research mission.

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

Meyers Creek/Snakey/Kelly

Same effects as alternative 1

East Beaver/Bernice/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, the unavailability of Snakey-Kelly and Bernice allotments for grazing would not provide range conditions necessary for the Sheep Station to continue its current and ongoing research mission.

Mountain States Transmission Intertie (MSTI) 500-kilovolt (kV) Transmission line Cumulative Effects

Cumulative effects of the Mountain States Transmission Intertie (MSTI) 500-kilovolt (kV) transmission line from Townsend, Montana, to Midpoint Substation near Twin Falls, Idaho would be similar for Alternatives 1, 3, 4, and 5.

The proposed power line ROW is 220 feet wide. Access along the transmission line ROW would include using existing roads in their current condition, using existing roads that would be improved as part of the project, and building new roads.

The longest alternative transmission line route (worst case) across ARS Headquarters property is about eight miles. Average span between towers for guyed-V steel lattice structures, approximately 125 feet high, and self-supporting steel lattice structures, most likely to be used on ARS property, is 1400 feet. There would be an estimated 30 tower sites on ARS property. Area occupied by towers varies from 100 square feet (0.002 acres) to 22,500 square feet, 0.5 acres, for guyed towers. Most of the area required for guyed towers would be the area spanned by guy lines from towers to anchors. Most of the area occupied by guy lines would have light disturbance, vegetation would be retained or disturbed areas would be replanted. With 30 possible tower sites on ARS land, 15 total acres could be affected at tower sites. Tower construction activities could affect a 220 by 220 foot area, 1.1 acres, at each tower site. Forage vegetation on about 33 total acres could be affected, short term, from tower construction activities. Vegetation at tower construction site would be restored after construction is complete.

During construction of the transmission line, there would be temporary pulling and tensioning sites, material staging sites, splicing sites, and concrete batch plants. These range in frequency from one every 30 to 35 miles for the batch plants and staging sites, to two sites every three miles for pulling, tensioning and splicing locations. An estimated five or six pulling, tensioning and spicing sites would have short term affects on about six acres of ARS Headquarters property. For the estimated eight miles of line on ARS property there probably would not be a need for concrete batch plants or additional material staging.

Permanent new roads would be graded to a travel surface width of 24 feet. Primary access to the power line ROW would be from the existing ARS road system. Some of the existing roads would be widened and the surface improved for permanent access.

Tower construction, line pulling and tensioning, conductor and tower material staging and line splicing sites could require an estimated four miles of temporary road construction access. About eight acres could be affected by temporary road construction. Temporary road disturbed areas would be restored and replanted for continued forage production after construction is complete.

Long term affected area would be on about 12.5 acres, 12 acres from road widening (high estimate), and about 0.5 acres total at the tower sites. Area under the guy lines at tower sites would continue to produce forage and be available for grazing. This would have a negligible effect on total forage production and available AUMs for sheep grazing. Range condition and trend from continued sheep grazing would not change.

Table 25 displays acres affected by Mountain States Transmission Intertie (MSTI) 500-kilovolt (kV) Transmission line.

Table 25. Mountain States Transmission Intertie power line cumulative effects affected acres

Activity	Short term	Long term
Permanent road widening		12
Temporary road construction	8	
Tower construction	18	15
Line pulling, material staging	6	
Total	44	27

Affects to existing rangeland from the Mountain States Intertie Transmission Line use would be negligible. Short-term impacts on grazing would result from construction activities and disturbance at tower sites, pulling sites, staging areas, and access roads. Long-term impacts on grazing would be low due to the small area disturbed on from Project construction and operation and effects would be mitigated by soil and vegetation reclamation practices.

Range Effects Summary

Table 26 displays available AUMs for each property and allotment and percent used under each alternative.

Table 26. 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 Agricultural Research Service	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 MOU (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	-

Alternative 1 would continue to provide range conditions necessary for the U. S. Sheep Experiment Station to continue its mission of current and ongoing research. While grazing cessation on various Agricultural Research properties and U.S. Forest Service and Bureau of Land Management allotments would have some changes in range conditions, the unavailability of those various parcels in alternatives 2 through 5 would not provide range conditions necessary for the U. S. Sheep Experiment Station to continue its current and ongoing research mission.

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

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Appendix A - Project Maps
These maps are located in appendix A of the EIS

Map 1. Vicinity map
Map 2. Overview with allotments
Map 3. East Summer Range inset guide map
Map 4. East Summer Range inset map 1 of 2
Map 5. East Summer Range inset map 2 of 2
Map 6. West Summer Range inset guide map
Map 7. West Summer Range inset map 1 of 4
Map 8. West Summer Range inset map 2 of 4
Map 9. West Summer Range inset map 3 of 4
Map 10. West Summer Range inset map 4 of 4
Map 11. Overview with sheep trails
Map 12. Headquarters property overview and land ownership
Map 13. Headquarters property roads and firebreaks
Map 14. Headquarters property wildfire history
Map 15. Headquarters property existing pasture fence
Map 16. Headquarters property prescribed fire history
Map 17. Headquarters property proposed pasture fence
Map 18. Headquarters property seeding
Map 19. Henninger Ranch streams
Map 20. Humphrey Ranch streams
Map 21. Humphrey Ranch proposed seeding and burning
Map 22. East Summer Range stream - Toms Creek grazing area
Map 23. West Summer Range – sheep drives and fence
Map 24. DOE Mud Lake Feedlot
Map 25. Alternative 2
Map 26. Alternative 3
Map 27. Alternative 4
Map 28. Alternative 5

Appendix B – Cattle and Horse Grazing Information

All of the grazing takes place between Oct.1st and Jan. 10 each year.

Some of the leases are several pastures combined.

Year	# Head	# Days
Headquarters Pastures		
West G Pasture 1,000 Acres		
2010	45	45
2009	70	52
2008	Rested	
2007	55	77
2006	No grazing	
2005	45	50
2004	73	7
2003	73	54
2002	24	28
2001	40	87
2000	45	38
North Pastures 1,920 Acres		
2010	99	33
2009	245	29
2008	96	30
2007	223	60
2006	No grazing	
2005	219	60
2004	280	128
2003	191	68
2002	Rested	
2001	95	63
2000	15	38
Savage Pastures 960 Acres		
2010	102	45
2009	260	30
2008	400	28
2007	260	52
2006	No grazing	
2005	257	65
2004	204	45
2003	180	42
2002	30	35
2001	19	42
2000	560	20

Year	# Head	# Days
South Pastures 1,240 Acres		
2010	102	45
2009	103	54
2008	78	70
2007	55	77
2006	No grazing	
2005	125	49
2004	223	112
2003	215	40
2002	95	55
2001	Rested	
2000	40	44
Crater Field 9,000 Acres		
2010	582	33
2009	732	60
2008	96	44
2007	142	50
2006	No grazing	
2005	Rested	
2004	621	37
2003	510	70
2002	Rested	
2001	726	27
2000	1,046	115
Well Field 6,600 Acres		
2008	711	28
This pasture was only grazed one year		

All Humphrey pastures grazing takes place between October 1 and November 15 each year.

Year	# Head	# Days	Year	# Head	# Days
Humphrey Pastures (East of Interstate 15)					
North Cow Pasture 640 Acres			**Hill Pasture 320 Acres**		
2010	511	15	2010	Rested	
2009	507	14	2009	Rested	
2008	498	14	2008	130	14
2007	400	25	2007	99	30
2006	No grazing		2006	No grazing	
2005	474	16	2005	102	36
2004	459	13	2004	246	14
2003	435	8	2003	Rested	
2002	507	15	2002	138	13
2001	444	10	2001	420	8
2000	Rested		2000	30	17
North Forest / Dam Pasture 640 Acres			**South Forest Pasture 320 Acres**		
2010	347	21	2010	115	42
2009	343	21	2009	195	36
2008	360	38	2008	200	40
2007	Rested		2007	157	30
2006	No grazing		2006	No grazing	
2005	350	20	2005	68	20
2004	357	27	2004	68	20
2003	357	27	2003	183	29
2002	361	40	2002	200	42
2001	197	24	2001	172	30
2000	357	41	2000	120	30
Corral Pasture 320 Acres			**Boatman / Center Pasture 640 Acres**		
2010	89	25	2010	62	40
2009	112	23	2009	85	40
2008	Rested		2008	120	12
2007	148	59	2007	Rested	
2006	No grazing		2006	No grazing	
2005	89	27	2005	124	12
2004	173	37	2004	140	15
2003	435	8	2003	222	28
2002	Rested		2002	120	9
2001	444	5	2001	420	8
2000	110	40	2000	102	21

Year	# Head	# Days	Year	# Head	# Days
Humphrey Pastures (West of Interstate 15)					
West Pasture 320 Acres			**Beaver Pasture 160 Acres**		
2010	16 horses	36	2010	6 horses	31
2009	6 horses	35	2009	No grazing	
2008	No grazing		2008		
2007			2007		
2006			2006		
2005			2005		
2004			2004		
2003	93	10	2003	54	15
2002	Rested		2002	Rested	
2001	90	5	2001	103	10
2000	100	17	2000	Rested	
Plowed Pastures 320 Acres			**Rock / North Pastures 160 Acres**		
2010	No grazing		2010	No grazing	
2009			2009		
2008			2008		
2007			2007		
2006			2006		
2005			2005		
2004			2004		
2003	40	35	2003	93	28
2002	Rested		2002	Rested	
2001	60	30	2001	90	2
2000	60	30	2000	93	17