

ENVIRONMENTAL ASSESSMENT

**Potato Ridge #01537
Change-in-Kind and Season-of-Use
Grazing Permit
DOI-BLM-WY-R010-2012-0106-EA**

September 2012

BLM

Worldland Field Office, Wind River/Bighorn Basin District, Wyoming



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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Potato Ridge Allotment #01537 Change-in-Kind and Season-of-Use Grazing Permit

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Type of Project: Grazing Management

General Location of Proposed Action: T52N and T51N, R92W, various sections

Name and Location of Preparing Office:

Worland Field Office
101 S. 23rd St.
Worland, WY 82401

Lease/Serial/Case File Number: GR4915437 and GR4915438

Applicant Name and Address:

Flitner Limited Partnership
c/o Stan and Mary Flitner
3541 Lane 32
Greybull, WY 82426

Flitner Ranch
c/o David and Paula Flitner
P. O. Box 8
Shell, WY 82441

1 INTRODUCTION AND NEED FOR THE PROPOSED ACTION

1.1 Background Information

The current grazing permittees propose to change permitted grazing use in the Potato Ridge Allotment #01537 from winter sheep use to cattle use. There are two grazing permits in the allotment at present held by separate livestock operations. Current permitted use is:

Flitner Limited Partnership	620 sheep	11/01-01/31	100%PL	375 AUMS
Flitner Ranch	1000 sheep	10/15-11/08	100%PL	164 AUMS

1.2 Purpose and Need for the Proposed Action

The permittees are not currently engaged in the sheep industry and the requested change would allow them to make use of their permitted grazing in the allotment.

1.3 Decision to be Made

The BLM will decide whether to convert the current winter sheep grazing use to requested cattle use and, if converted, under what mandatory terms and conditions such use will be made.

1.4 Conformance

The proposed action and alternatives described below are in conformance with the Washakie Resource Management Plan ROD, approved September 2, 1988.

The Washakie RMP management objective for livestock grazing management is,

“To provide forage for livestock grazing, to reduce conflicts between livestock grazing and other resource uses, and to improve ecological range condition.”

The RMP also specified the following Management Actions necessary to achieve the above objective:

“Livestock grazing would continue as currently authorized on all 307 allotments administered by the Washakie Resource Area, unless adequate data are available to support adjustments. Season of use, distribution, and kind, class and number of livestock would be adjusted to improve vegetative and wildlife resources and to protect areas unsuitable for livestock grazing on a case-by-case basis or as AMP’s are developed on the allotments.” [Page 20]

“Adjustments in grazing use may include one or more of the following:

- changes in season of use,
- changes in class, kind and number of livestock,
- changes in grazing management, and
- changes in current use levels.” [Page 20]

“Management actions will be implemented to accomplish the long-term objective of good or better range condition on an estimated 960,000 acres of public land. Among the actions that will be used are those listed in Appendix B.” [Page 43]

Appendix B, Table B-1 listed the following management actions which are applicable to this allotment [Page 43]:

“As a general rule, on all allotment categories, adjustments would limit use prior to seed ripe on key forage species to one year out of 2 or 3 in areas with less than 10 inches of annual precipitation and one year out of 2 in areas with 10 or more inches of precipitation. A rest cycle would be considered any time use occurs prior to seed ripe.”

“As a goal, use of key species on selected key areas would be limited to a level that would meet the objectives of allotment management, normally a maximum of 50 percent utilization by wildlife and livestock of current year’s production.”

1.5 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses

- Taylor Grazing Act of 1934,
- Federal Land Policy and Management Act of 1976
- Public Rangelands Improvement Act of 1978
- The principal Bureau permitting regulations for livestock grazing are found in 43 CFR 4100.
- The primary regulations governing NEPA analysis are 40 CFR 1500 (RE: The President’s Council on Environmental Quality implementing regulations for procedural provisions of NEPA).

1.6 Scoping, Public Involvement and Issues

1.6.1 Scoping

The proposed action was reviewed internally by an interdisciplinary team. The Environmental Assessment will be mailed to all Interested Publics (IP”s) for external scoping and comment.

1.6.2 Issues Identified

The following issues were identified by the BLM ID team:

Cultural and Paleontology Resources

- ❖ How would the proposed action affect historic properties?
- ❖ How would the proposed action affect significant localities (paleontological resources)?

Wildlife Resources

- ❖ How would the change in kind of livestock grazing affect antelope and mule deer habitat?
- ❖ How would the change in season of use affect available forage for antelope and mule deer?

Water Resources

- ❖ How would the proposed action change hydrologic function of rangeland health in the watershed?
- ❖ What would be the change to water consumption needs?
- ❖ How would change in permit impact surface water quality and reservoirs in the allotment?

Invasive Species/Noxious Weeds

- ❖ Has there been an increase in non-natives due to the 15 years of unauthorized spring cattle use?
- ❖ What changes to the plant community have we seen from the conversion?

Livestock Grazing

- ❖ What is the stocking rate for a conversion from sheep to cattle?

Vegetation Excluding USFW Designated Species

- ❖ What impact would the change in season and kind have on current species composition?

Soil Resources

- ❖ How would change from sheep to cattle and the changes in season of use impact runoff and erosion?
- ❖ What would be impacts to soil resource as reflected in Rangeland Health attributes of *Soil-Site Stability* and *Hydrologic Function*?

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Alternatives Considered

2.1.1 Alternative 1: No Action

Deny the requested conversion and continue to permit winter sheep use. Current permitted use is:

Flitner Limited Partnership	620 sheep	11/1-1/31	100%PL	375 AUMS
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Terms and Conditions:

Utilization levels on key forage plant species on public land shall not exceed 50 percent of current year's growth in accordance with the Washakie RMP.

Flitner Ranch	1000 sheep	10/15-11/08	100%PL	164 AUMS
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Terms and Conditions:

Utilization levels on key forage plant species on public land shall not exceed 50 percent of current year's growth in accordance with the Washakie RMP.

2.1.2 Alternative 2: Proposed Action

Convert both permits to cattle use with a change in grazing scheme. The Flitner Limited Partnership (Diamond Tail Ranch) has proposed to convert permitted use from winter sheep use to spring cattle use and utilize the Potato Ridge Allotment in a Growing Season Deferred grazing system. The Potato Ridge Allotment would be grazed in a 3 year cycle with spring use¹ (May 1-June 20) one year and fall/winter use (October 16 to February 28) for two succeeding years. This rotation would give plant communities two growing seasons rest after spring use. This management system will also apply to the Flitner Ranch Permit meaning only one herd will be using the allotment at any one time. Grazing years designated for spring use will apply to both grazing permits and permittees. Under this alternative, key forage plants would be bottlebrush squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), or bluebunch wheatgrass (*Pseudoroegneria spicata*).

This alternative is based on current range conditions and suggested stocking rates from the Ecological Site Descriptions (ESD) developed by the Natural Resource Conservation Service (2005) for range sites within this allotment. The proposed grazing would be permitted as follows:

Flitner Limited Partnership	149 cattle	05/01 – 06/20	100%PL	250 AUMS
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Terms and Conditions:

The Potato Ridge Allotment will be grazed in a 3 year cycle with spring use (May 1-June 20) one year and fall/winter use (October 16 to February 28) for two succeeding years. Spring grazing use will occur in 2013, 2016, 2019, and 2022.

¹ The Grass Creek Resource Management Plan Draft EIS, 1994, Appendix 3, Table 3-6 defines the start of dormancy as October 15 and the start of spring growth as April 11 for Saline Upland range sites in the 5-9" precipitation zone. The Natural Resource Conservation Service Ecological Site Descriptions Technical Guide, 2008, for Saline Upland range sites in the 5-9" precipitation zone states that, "Growth of native cool-season plants begins about April 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October."

Livestock numbers may vary within the spring use period (May 1 to June 20) and the fall/winter use period (October 16 to February 28) as long as the total number of AUMS does not exceed 250 public AUMS, as approved by the authorized officer.

Utilization on key forage plants would be limited to Light Use (21%-40%) and will not exceed 40 percent of current year's growth during the spring use period (May 1 to June 20). If utilization after grazing exceeds 40 percent the allotment will be totally rested the following year.

Utilization levels on key forage plant species during the fall/winter use period (October 16 to February 28) will be limited to 50 percent of current year's growth. If utilization after grazing exceeds 50 percent of current year's growth the allotment will be totally rested the following year.

The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a timeframe for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

Flitner Ranch 64 cattle 05/01 – 06/20 100%PL 107 AUMS

Terms and Conditions:

The Potato Ridge Allotment will be grazed in a 3 year cycle with spring use (May 1-June 20) one year and fall/winter use (October 16 to February 28) for two succeeding years. Spring grazing use will occur in 2013, 2016, 2019, and 2022.

Livestock numbers may vary within the spring use period (May 1 to June 20) and the fall/winter use period (October 16 to February 28) as long as the total number of AUMS does not exceed 107 public AUMS, as approved by the authorized officer.

Utilization on key forage plants would be limited to Light Use (21%-40%) and will not exceed 40 percent of current year's growth during the spring use period (May 1 to June 20). If utilization after grazing exceeds 40 percent the allotment will be totally rested the following year.

Utilization levels on key forage plant species during the fall/winter use period (October 16 to February 28) will be limited to 50 percent of current year's growth. If utilization after grazing exceeds 50 percent of current year's growth the allotment will be totally rested the following year.

The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological

sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places;
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- a timeframe for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

2.1.3 Alternative 3: Annual Spring Grazing

The Potato Ridge Allotment would be grazed annually in the spring (May1- June 20) during the critical growth period for desirable perennial bunchgrasses. Utilization would be limited to Light Use (21%-40%). This system would apply to both permits. Under this alternative, key forage plants would be bottlebrush squirreltail, Indian ricegrass, or bluebunch wheatgrass.

This alternative is based on current range conditions and suggested stocking rates from the Ecological Site Descriptions (ESD) developed by the Natural Resource Conversation Service (2005) for range sites within this allotment. The proposed grazing permits would look as follows:

Flitner Limited Partnership 149 cattle 05/01 – 06/20 100%PL 250 AUMS

Terms and Conditions:

Livestock numbers may vary within the spring use period (May 1 to June 20) as long as the total number of AUMS does not exceed 250 public AUMS, as approved by the authorized officer.

Utilization on key forage plants would be limited to Light Use (21%-40%) and will not exceed 40 percent of current year's growth. If utilization after grazing exceeds 40 percent the allotment will be totally rested the following year.

The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a timeframe for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the

conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

Flitner Ranch 64 cattle 05/01 – 06/20 100%PL 107 AUMS

Terms and Conditions:

Livestock numbers may vary within the spring use period (May 1 to June 20) as long as the total number of AUMS does not exceed 107 public AUMS, as approved by the authorized officer.

Utilization on key forage plants would be limited to Light Use (21%-40%) and will not exceed 40 percent of current year's growth. If utilization after grazing exceeds 40 percent the allotment will be totally rested the following grazing year.

The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a timeframe for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

2.1.4 Alternative 4: No Grazing

Under this alternative no grazing use would be authorized on the Potato Ridge #01537 Allotment. The requested change in kind of livestock and change in season of use would not be approved.

3 AFFECTED ENVIRONMENT and ENVIRONMENTAL EFFECTS

3.1 Introduction

3.1.1 General Setting and Geographic Scope of the Project Area

The Potato Ridge Allotment is located approximately 9 miles east/southeast of Greybull, Wyoming in Big Horn County in T52 and 51N, R92W. There are 8,800 acres of public land and 347 acres of State of Wyoming land within the allotment. Elevations within the allotment range from 4,100 to 4,300 feet above sea level. Topography consists of rolling hills dissected by ephemeral drainages. Active bentonite mining occurs along the westernmost portion of the allotment. The allotment is unfenced on the west and south sides. Water sources consist of a stock water pipeline and several reservoirs. The allotment is not identified as crucial habitat for wildlife.

Range

The allotment is categorized as a “Custodial” category allotment in the Washakie RMP. The Selective Management Category process was initiated in 1982 and was used primarily to establish priorities for investing in range improvements. Allotments were categorized on specific criteria in the Washakie RMP as “I” (Improve Existing Resource Conditions), “M” (Maintain Existing Resource Conditions), or “C” (Custodial Management) allotments. Criteria for “C” allotments included the following:

- Range condition is probably not a factor;
- These allotments have low potential due to low annual precipitation and/or soils with low production capabilities and are producing near their potential;
- There are only limited conflicts, if any, with other resource uses;
- Present management appears to be satisfactory, is the only logical practice under existing resource conditions, or the costs of changing management practices exceed the benefits expected;
- Opportunities for positive economic return on public investment do not exist or are not economic under current technology; or
- The allotment contains only a small acreage of public land or is made up of isolated, noncontiguous tracts that make up less than 20 percent of the total allotment.

As such, the Potato Ridge Allotment has been a low priority for monitoring however the allotment was assessed for compliance with the Wyoming Standards for Rangeland Health in 1999 and was found to meet all standards.

The allotment lies in the 5-9 inch precipitation zone. Dominant ecological sites are saline upland and shale sites. Current vegetation is predominantly Gardner saltbush with bottlebrush squirreltail and Indian ricegrass present in minor proportions. Intermixed with these dominant sites are sites which exhibit somewhat more diverse plant communities. These sites have Wyoming big sagebrush (*Artemisia tridentate*) mixed in the overstory with an herbaceous component characterized by bluebunch wheatgrass, bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass (*Poa secunda*), and various forbs. These sites are adjacent to less diverse and productive sites and probably reflect innate soil properties.

In 1998 a stock water pipeline was constructed in the Potato Ridge Allotment. Water is piped into existing reservoirs for livestock. This pipeline was constructed in cooperation with the Wyoming Game and Fish and included “Water for Wildlife” funding. The purpose of this project was to provide for wildlife needs and to facilitate spring grazing by domestic livestock. The

project was analyzed in Environmental Assessment WY-018-EA8-170 and the FONSI/Decision Record was signed on August 11, 1998.

The allotment has been grazed by Flitner Limited Partnership (Diamond Tail Ranch) with spring cattle use since 1997. The Flitner Ranch Permit has not been authorized. Authorized use has been made during the May-June period at various levels of AUMS. All information is from paid grazing bills.

Table 1. Summary of Licensed Use for Flitner Limited Partnership

Year	Grazing Period	AUMS
1997	5/2-5/16	112
1998	5/6-5/13	62
	11/11-12/15	130
1999	4/30-6/11	373
2000	4/30-5/9	64
2001	NONUSE	0
2002	5/3-6/17	237
2003	NONUSE	0
2004	NONUSE	0
2005	5/13-6/18	242
2006	5/1-5/31	280
2007	NONUSE	0
2008	5/3-6/1	375
2009	5/4-6/1	348
2010	5/4-6/16	589
2011	5/4-6/20	589

Average licensed use from 1997 to 2011 including nonuse was 227 public AUMS.

3.1.2 Issues Considered but Eliminated from Further Analysis

The following issues were determined to be “Not Present” by the ID Team within the proposed action or alternatives and are not discussed further in this EA. They include:

Areas of Environmental Concern, BLM Natural Areas, Environmental Justice, Farmlands (Prime or Unique), Floodplains, Lands/Access, Native American Religious Concerns, Socio-Economics, Threatened, Endangered, Sensitive, or Candidate Plant Species, Wastes (hazardous or solid), Wild and Scenic Rivers, Wilderness/WSA, Woodland/Forestry, Wild Horses and Burros, or Areas with Wilderness Characteristics.

The following issues (Threatened and Endangered, Candidate, or Sensitive Animal Species, Wetlands/Riparian Zones, Air Quality/Climate Change, Greenhouse Gas Emissions, Fuels/Fire Management, Migratory Birds, Recreation, and Visual Resources) were identified by the ID Team as potential issues of concern. These issues are addressed in this section.

Threatened, Endangered, Candidate and BLM Sensitive Animal Species

This issue is not analyzed in the EA because no sage grouse core area habitat or known sage grouse leks are located in the allotment. The lack of sagebrush vegetation types within the allotment indicates a lack of habitat for sagebrush obligate species.

Although the allotment lies within an area designated as suitable habitat for mountain plover, none of the birds have been observed or recorded utilizing the habitat.

Wetlands/Riparian Zones

This issue is not analyzed in the EA because there are no inventoried riparian or wetlands on public land within the allotment and reservoir areas would not sufficiently meet the US Army Corp of Engineers wetland criteria for hydrology, soils, and vegetation, with the exception of Two Doe reservoir that is artificially augmented and is discussed in the hydrology section.

Air Quality/Climate Change and Greenhouse Gas Emissions

This issue is not analyzed in the EA because only a small amount of methane gas is generated.

Fuels/Fire Management

This issue is not analyzed in the EA because present fire regime will not be different from that of the past fire regime.

Migratory Birds

The proposed action is not expected to have any effect on migratory birds, therefore the issue is not analyzed in this EA.

Recreation

This issue is not analyzed in the EA because the proposed action would not change the recreational settings and use currently observed.

Visual Resources

This issue is not analyzed in the EA because grazing use has been an historic land use on the landscape and has been documented during visual resource inventory.

3.2 Resources/Issues Carried Forward for Analysis

3.2.1 Cultural Resources, Traditional Cultural Properties, Native American Religious Concerns

3.2.1.1 *Issue(s) Identified*

How would the proposed action affect historic properties?

3.2.1.2 *Affected Environment*

Following policy provided in Instruction Memorandum (IM) WO-99-039, IM WY-99-020 and BLM Manual 8100 series a literature review was conducted using State Historic Preservation Officer (SHPO) and BLM records (BLM Cultural Project 010-2012-093). Results of the file search indicate that the Potato Ridge Allotment contains four (4) known cultural resource sites. None of the sites are eligible for listing on the National Register of Historic Places (NRHP). Six (6) Class III inventory have been completed within the allotment covering approximately 921 acres. The operator is responsible for informing all persons in the area who are associated with this allotment (including development projects) that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. Per the Wyoming State Protocol Agreement between the BLM and the SHPO (State Protocol) at Appendix B.2, issuing a lease or permit that does not authorize or promote surface disturbance is exempt from class III inventory.

3.2.1.3 *Direct and Indirect Effects*

Alternative 1: No Action

Alternative 1 is not expected to affect cultural resources given the fact that the rangeland health standards were met in 1999 and the recent rangeland monitoring results are acceptable. In accordance with the Wyoming State Protocol at Appendix B.27, renewal of grazing permits where type of animals and seasons of use do not change is exempt from Class III inventory.

Alternative 2: Proposed Action

Under the current policy (IM WO-99-039, IM WY-99-020, and Wyoming State Protocol) when there will be changes in the grazing permit a review of cultural records can be used to identify affects to known historic or unevaluated properties. Results of the file search indicate that Potato Ridge Allotment contains four not eligible sites. No historic properties are located within known livestock concentration areas. Consultation was conducted with the State Historic Preservation Officer (SHPO) under the State Protocol (BLM Cultural Project 010-2012-093). Under current policy no additional analysis of known cultural resource sites is required.

In regards to unidentified cultural properties, there is a direct relationship between the rangeland health and potential effects to cultural resources. Provided rangelands remain in satisfactory condition and are not overgrazed, the cultural resources are not anticipated to be adversely effected from grazing lease renewals. Rangeland deterioration could constitute a viable threat to cultural properties. Alternative 2 is not expected to affect cultural resources given the fact that the 1999 rangeland health standards were met and the recent rangeland monitoring results are acceptable.

Affects to cultural resources are most probable in high use areas such as around water wells or bottlenecks where livestock congregate. Those facilities that were in place prior to the initial Resource Management Plan (RMP) are considered an existing disturbance. Per Section IV-D Identification d. Existing Disturbance of the Wyoming State Protocol, after a determination by a

cultural resource specialists, undertakings within previously disturbed areas are generally authorized to proceed without additional class III inventory. Those facilities installed after the RMP were previously subject to consideration under the NHPA. Away from livestock focal points, surface disturbance is minimal and impacts to cultural resources are negligible. Any and all future range development projects within the allotment will comply with the Wyoming State Protocol process, are subject to relevant cultural investigations prior to permit issuance, and will be analyzed under a separate and site specific EA.

Because livestock grazing is a dynamic ongoing process, cultural resource specialists, in conjunction with BLM range management and the leasee, will periodically monitor and inspect heavy use areas and cultural resource sites following current policy (Washakie RMP and BLM Manual 8100 series). Any adverse effects discovered will be mitigated in accordance with the State Protocol. Standard cultural stipulations apply.

Alternative 3: Annual Spring Grazing

Effects would be similar to the Proposed Action.

Alternative 4: No Grazing

Under the No Grazing Alternative, the proposed grazing allotment renewal would not occur. A review of the historical records on file in the Worland Field Office indicates that Potato Ridge Allotment, is not eligible for the National Register of Historic Places (36CFR§60.4(a) and (b)). No historic properties will be affected by this alternative.

3.2.1.4 Cumulative Effects and Analysis

None

3.2.2 Paleontology

3.2.2.1 Issue(s) Identified

How would the proposed action affect significant localities (paleontological resources)?

3.2.2.2 Affected Environment

The surface formations of the Potato Allotment are Cody Shale and Frontier Formation. The formations have a PFYC (Potential Fossil Yield Classification) rating of three or moderate. This means the allotment has a moderate sensitivity for paleontological resources. Significant fossil localities are not common. There are no recorded fossil localities within the Potato Ridge Allotment. Because of the low potential to affect significant paleontological localities, a site-specific field inventory was not completed.

3.2.2.3 Direct and Indirect Effects

Alternative 1: No Action

Under the No Action Alternative, no changes would occur in the permit. No resulting effects on paleontological resources would be expected to occur beyond the current situation.

Alternative 2: Proposed Action

Significant paleontological localities are not common within the formations in the Potato Ridge Allotment. There are no recorded fossil localities within the allotment. Effects on paleontological resources are most likely to occur at heavy use areas where livestock congregate. Outside these areas effects are minimal and dispersed. Paleontological resources are primarily found on bare, non-vegetated outcrops which are created as the result of active

erosion processes. These are not locations livestock congregate. The Preferred Alternative has a low potential to affect paleontological localities. Because of the low potential to affect significant paleontological localities, a site-specific field inventory was not completed. Standard paleontology stipulations apply.

Alternative 3: Annual Spring Grazing

Effects would be similar to the Proposed Action.

Alternative 4: No Grazing

Effects would be similar to Alternative 1.

3.2.2.4 Cumulative Effects and Analysis

None

3.2.3 Invasive, Non Native Species Noxious Weeds

3.2.3.1 Issue(s) Identified

Has there been an increase in non-natives due to the 15 years of unauthorized spring cattle use? What changes to the plant community have we seen from the conversion?

3.2.3.2 Affected Environment

Saltcedar, a state and federally listed noxious weed is found mainly near reservoirs or other water sources and drainages. Approximately 2 acres of infestation had been documented as of 2005. One occurrence of another noxious weed species, leafy spurge (0.1 acre) has been recorded on the allotment, the location was checked in June of 2012 and no spurge was found. Invasive annual plants such as cheatgrass, halogeton and annual wheatgrass occur near the bentonite mining area and haul road at the northern end of the allotment. Trend data showing change in invasive plant cover is not available for this analysis, but the majority of invasive plants found on the allotment occur around areas of previous soil disturbance (road and reservoir building, mining). No treatments to known populations of saltcedar have occurred since 2005, so it can be assumed that treated populations have rebounded or new ones have become established. For example, Two Doe Reservoir was constructed in 1998 and treated in 2005, but dozens of saltcedar plants can be seen there now along one portion of the bank (see photo 10).

3.2.3.3 Direct and Indirect Effects

Alternative 1: No Action

Established populations of saltcedar would continue to spread through hydrologic processes and other seed dispersal vectors, but winter grazing use would not increase the risk, or rate, of spread.

Alternative 2: Proposed Action

Livestock can serve as a vector for seeds of invasive plants. Hoof action in wet areas or during periods of rainfall can disturb the soil and could increase the risk for invasive plant germination and establishment, compared to grazing when soil is dry or frozen. Spring conditions are more likely to be wet/muddy than other times of year. "Cattle and sheep tend to browse heavily on young tamarisk seedlings and mature plants if the stand is open. More commonly, livestock tend to browse native plants (e.g. cottonwood and willow), giving tamarisk the competitive

advantage in areas grazed by livestock.”² Cattle require much more water than sheep, especially in warmer weather, and will spend more time near water sources as a result. Without treatment, saltcedar cover would continue to increase around reservoirs and drainages more rapidly as a result of the hoof action by cattle around reservoirs and drainages during spring, compared to winter use when soil is frozen.

Alternative 3: Annual Spring Grazing

Effects would be similar to Alternative 2.

Alternative 4: No Grazing

Effects would be similar to Alternative 1.

3.2.3.4 Cumulative Effects and Analysis

None.

3.2.4 Rangeland Vegetation

3.2.4.1 Issue(s) Identified

What impact would the change in season and kind have on current species composition?

3.2.4.2 Affected Environment

The allotment is dominated by Saline Upland and Shale ecological sites. The allotment was last inventoried in 1984 using old range site concepts. Results were as follows:

Table 2. 1984 Range Condition

Total Acres	Excellent	Good	Fair	Poor	Unclassified	Public Land	Other
9147	0	4010	3133	0	2004	8800	347

Table 3. Range Site Summary

Range Site	Good	Fair	Poor	Not Conditioned
Saline Upland	722	2963	227	
Shale	3288	162		
Rock Outcrop				1643

Incidental acreages of Loamy, Shallow Loamy, and Saline Lowland sites were inventoried in 1984.

Additional Vegetation Data

In 2009 a cover transect using line/point intercept was established in Section 35, T52N, R92W, on a saline upland site that had been identified by the permittee as showing improvement over the years. Line point data was collected in 2009 and 2012. Data indicated that bare ground was 51 percent, vegetation cover was 35 percent, litter 12 percent, and gravel 2 percent. No desirable perennial grasses were sampled in 2009 but were observed on the site. In 2012, the site had a noticeable amount of Sandberg bluegrass which was not apparent in 2009. This situation is reflected in the vegetation cover rating for the site in 2012. Using state and transition model concepts the site represents the Perennial grass/Mixed shrub state for Shale ecological sites.

²Zouhar, Kris. 2003. Tamarix spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, October 30].

Table 4. Cover Transect

Cover Transect	Bare Ground	Vegetation	Litter	Gravel
2009	51%	35%	12%	2%
2012	39%	48%	11%	2%

In 2012, two additional sites were sampled to represent the ecological sites/states present in the allotment.

A sample point/ line point intercept transect (#1) was established on a Saline Upland 5-9 site in Section 22, T52N, R92W. The site is dominated by Gardner’s saltbush with sparsely scattered Sandberg bluegrass and Bottlebrush squirreltail plants present. The site was judged to be in low fair range condition. Using state and transition concepts the site would represent the Gardner’s saltbush/Bare ground state for saline upland ecological sites.

Table 5. Line Point Intercept at Sample Point Transect #1

	Bare Ground	Vegetation	Litter	Gravel
2012	49%	30%	14%	7%

Table 6. Sample Point #1 Baseline Data

# POINTS	GRASS	FORB	SHRUB	CACTUS	LITTER	ROCK	SOIL	BIO	INV	UNK	SHADOW	OBJECT
500	0	0	101	1	88	7	192	111	0	0	0	0
100%	0%	0%	20%	<1%	18%	1%	38%	22%	0%	0%	0%	0%

BIO = Biological Crust INV = Invasive UNK = Unknown

A sample point/ line point intercept transect (#2) was established on a Shale 5-9 site in Section 3, T51N, R92W. This site was much more diverse with bluebunch wheatgrass, Indian ricegrass, Bottlebrush squirreltail common on the site along with Gardner’s saltbush and woody aster. The site was judged to be in good range condition. Using state and transition model concepts the site represents the Perennial grass/Mixed shrub state for Shale ecological sites.

Table 7. Line Point Intercept at Sample Point Transect #2

	Bare Ground	Vegetation	Litter	Gravel
2012	49%	44%	4%	3%

Table 8. Sample Point #2 Baseline Data

# POINTS	GRASS	FORB	SHRUB	CACTUS	LITTER	ROCK	SOIL	BIO	INV	UNK	SHADOW	OBJECT
500	10	2	79	1	41	18	327	19	0	0	3	0
100%	2%	<1%	16%	<1%	8%	4%	65%	4%	0%	0%	<1%	0%

BIO = Biological Crust INV = Invasive UNK = Unknown

Grazing impacts to ecological site integrity can be tied closely to stocking rate, kind of livestock, season of use, and level of use. Expected impacts of the proposed change in use will be compared to 1984 baseline information which resulted in the allotment being categorized as a "Custodial" allotment.

Potential grazing impacts to vegetation condition and potential stocking rate will be analyzed using the most recent methodology available- ecological site descriptions and associated state and transition modeling.

“States” are plant communities on a site which are relatively stable given current management and conditions. They can reflect the result of plant succession and/or impacts of past management of a site. Transitions are pathways between plant communities. These pathways can be things such as proper or improper grazing practices, seedings, prescribed burning, etc. (See Appendix B for complete ESDs).

Following are plant communities and pathways for the Saline Upland 5-9 ecological site:

Gardner’s saltbush/Indian ricegrass/Bottlebrush Squirreltail Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and droughty saline and/or alkali soils. This plant community can be found on areas that are properly managed with grazing and on areas receiving short periods of rest. Potential vegetation is about 50 percent grasses or grass-like plants, 10 percent forbs, and 40 percent woody plants. Transitions or pathways leading to other plant communities are as follows:

- Moderate, Continuous Season-Long grazing will convert this plant community to the *Gardner’s Saltbush/Bottlebrush Squirreltail Plant Community*.
- Severe ground disturbance will convert this state to the *Halogeton Plant Community*.

Gardner’s Saltbush/Bottlebrush Squirreltail Plant Community

Historically, this plant community evolved under grazing by large ungulates. Currently this vegetation state is found under moderate season-long grazing by livestock transitional pathways leading to other plant communities are as follows:

- Prescribed grazing will prevent further deterioration and over the long-term may return this state to near *Historic Climax Plant Community*.
- Frequent and severe grazing will convert this state to *Gardner Saltbush/Bare Ground Plant Community*.
- Severe ground disturbance will convert this state to the *Halogeton Plant Community*.

Gardner’s Saltbush/Bare Ground Plant Community

This plant community can occur where sites are subjected to continuous yearlong grazing. Gardner’s saltbush dominates this state and in some cases comprises almost 100 percent of the plant community. Transitional pathways leading to other plant communities are as follows:

- Very long term prescribed grazing may eventually return this plant community at or near the HCPC.
- Severe ground disturbance will convert this state to the *Halogeton Plant Community*.

Halogeton Plant Community

This plant community is a result of severe ground disturbance. Halogeton, bottlebrush squirreltail, and bare ground are a major part of this state. Sparse saline tolerant grasses can be found in the understory with the balance made up of annual forbs. Transitional pathways leading to other plant communities are as follows:

- Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing Plan will return this plant community to near *Historic Climax Plant Community (Gardner’s Saltbush/Bunchgrass State)* although halogeton will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

Following are plant communities and pathways for the Shale 5-9 ecological site:

Bottlebrush Squirreltail/Gardner's Saltbush Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and droughty soils due to the shallow depth to undeveloped salty weathered shale material. The major grasses include bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, and rhizomatous wheatgrasses. Other grasses occurring in this state include alkali sacaton, blue grama, and Sandberg bluegrass. Gardner's saltbush and winterfat are conspicuous elements of this state. A variety of forbs also occur in this state and plant diversity is high. Transitions or pathways leading to other plant communities are as follows:

- Moderate, Continuous Season-Long grazing will convert this plant community to the *Perennial Grass/Mixed Shrub Plant Community*. Prolonged Drought will exacerbate this transition.

Perennial Grass/Mixed Shrub Plant Community

Historically, this plant community evolved under grazing and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock and will be exacerbated by prolonged drought conditions. This plant community is still dominated by cool-season midgrasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. A variety of shrubs makes up the overstory. Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing or possibly long-term prescribed grazing will convert this plant community to the *HCPC*. The probability of this occurring is high especially if rotational grazing along with short deferred grazing is implemented as part of the prescribed method of use.
- Frequent and severe grazing over the long-term will convert this plant community to the *Birdfoot Sagebrush/Woodyaster vegetative state*.

Birdfoot Sagebrush Plant Community

This vegetation state currently is found under heavy, season-long grazing by livestock in the absence of fire. Birdfoot sagebrush is a significant component of this plant community. Other plants, which may be of importance, include Gardner's saltbush, and bud sagebrush. Cool-season grasses have been reduced. Bare ground, warm season grasses, and annual plants are also prominent. Transitional pathways leading to other plant communities are as follows:

- Brush management (fire) and prescribed grazing will return this state to near *Historic Climax Plant Community*. Seeding native perennials may be necessary to hasten establishment of these species.

As stated previously, the allotment was inventoried in 1984 using the older range site concept. Excellent range condition approximates the HCPC for these sites. Good and fair range condition would *approximate* the *Gardner's saltbush/Bottlebrush Squirreltail* and *Gardner's Saltbush/Bare Ground* states for saline uplands and the *Perennial Grass/Mixed Shrub Plant Community for the shale sites*. These are approximations only as the two systems are not directly comparable. However, analysis of the field data sheets along with professional judgment allows for a valid analysis.

Critical Growing Season

Ecological Site Descriptions for this allotment identify the following growth curve for vegetation on Shale and Saline Upland sites:

Growth curve description: ALL UPLAND SITES

(Monthly percentages of total annual growth)

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
0	0	0	15	50	20	5	0	10	0	0	0

The critical growth season for desirable forage grasses includes the period of time of rapid leaf elongation to flowering to seed set. In this area this period would coincide with the late April through late June period identified in the “growth curve” above. Gardner’s saltbush follows a similar pattern: “Gardner’s saltbush begins annual growth in the spring. The flowering period extends from May through July, depending on ecotype and climatic factors, with intermittent flowering after periods of heavy rain (Blauer, A. Clyde; Plummer, A. Perry; McArthur, E. Durant; [and others], 1976. Res. Pap. INT-177. Ogden, UT: U.S.D.A., Forest Service, Intermountain Forest and Range Experiment Station. 49 p.)”. Gardner’s saltbush regenerates from seed so providing for seed set is key for managing these stands along with associated herbaceous species.

3.2.4.3 Direct and Indirect Effects

Alternative 1: No Action

Winter sheep use would result in a continuation of the conditions observed in 1999. The majority of ecological sites are dominated by Gardner’s saltbush with varying amounts of perennial grasses and forbs present. Dormant season use at moderate levels (50% or less) would maintain and likely allow an improving upward trend in current species composition over the long term.

Alternative 2: Proposed Action

The majority of the allotment acreage would be classified as *Gardner’s Saltbush/Bare Ground Community* and *Gardner’s saltbush/Bottlebrush Squirreltail Community* states for saline uplands and the *Perennial Grass/Mixed Shrub Plant Community* for the shale sites. The proposed grazing rotation would meet the requirements for “long-term prescribed grazing” and should allow for plant succession towards HCPC as described in the Ecological Site Description. Generally, cattle prefer herbaceous species such as grasses over shrubs. However Gardner’s saltbush is also a preferred feed for livestock in the spring, thereby dispersing grazing pressure among the plant community throughout the allotment. The prescribed grazing under this alternative would likely maintain or improve the upland rangeland health conditions by providing a stocking rate that is appropriate throughout the year and defers the grazing two out of three years to post seed ripe. The prescribed grazing provides a stocking rate of 20 acres/AUM which would help ensure that the majority of the key species within the allotment would either be used lightly or not used at all during that timeframe. Plants that are grazed lightly during this timeframe would have the vegetative matter and capability to grow, produce viable seed, and replenish energy reserves. The vast majority of the rangeland plants on public land would grow and complete a growth cycle without any domestic grazing pressure two out of three years. Grazing post seed ripe would also occur at a proper stocking rate and at a time that would be least likely to cause an interruption to the plant’s physiological or morphological processes. After seed ripe there is little or no active plant growth that would occur because the plants would have completed the annual cycle of producing seed and the climatic conditions are often unfavorable for further plant growth.

The proposed action would allow the permittee to vary livestock numbers within the specified use period as approved by the authorized officer. No additional AUMS would be authorized,

therefore the stocking rate (Acres per AUM) would not change, but this would allow the operator flexibility in his livestock operations.

Alternative 3: Annual Spring Use

The impacts of annual May-June spring use could be negative for upland vegetation composition depending on utilization levels and opportunities for recovery post-grazing use. Relatively heavy utilization levels (>50%) during critical growth periods on an annual basis would reduce herbaceous plant vigor and reproduction. This would also be expected to be true for Gardner's saltbush. This area is subject to droughty conditions so proactive grazing management would be required to avoid adverse impacts to perennial plant species subject to grazing use. Spring use at light levels (35% or less) could maintain current species composition over the long term. Likely a rest period would be required the following season if utilization exceeded 50 percent on key species in any given spring.

The proposed action would allow the permittee to vary his livestock numbers within the specified use period as approved by the authorized officer. No additional AUMS would be authorized, therefore the stocking rate (Acres per AUM) would not change, but this would allow the operator flexibility in his livestock operations.

Alternative 4: No Grazing

Under this alternative no livestock grazing would be authorized. The vegetative community, Gardner's saltbush and assorted native perennial grasses, would be able to complete their yearly life cycle absent the effects of defoliation due to livestock grazing. This alternative would likely allow an improving upward trend in current species composition over the long term.

3.2.4.4 Cumulative Effects and Analysis

Active bentonite mining occurs in the western part of the Potato Ridge Allotment. The Cumulative Effects Analysis (CEA) area identified in an Environmental Assessment³ was 8.9 square miles or 6363.33 acres with approximately 560 acres or 8 percent of the total area disturbed by mining in the past 40 years and approximately 593.4 acres or 9 percent of the total area to be mined within the next 15-20 years. Historically, these lands have been used for livestock grazing (sheep and cattle). Approximately 560 acres have been disturbed in the CEA area and 491.4 acres reclaimed and seeded with native vegetation. No change in permitted AUMS has occurred based on this disturbance; and in some unquantifiable instances, with successful reclamation, vegetation is present in areas that were documented as bare-ground prior to disturbance. With the cast-back system Wyo-Ben incorporates into their activities, the present kind and number of livestock and the number of days/seasons they graze is expected to continue in the future.

3.2.5 Livestock Grazing

3.2.5.1 Issue(s) Identified

What is the stocking rate for a conversion from sheep to cattle?

3.2.5.2 Affected Environment

Any conversion of type and season of grazing use brings up potential concerns about stocking rate. The allotment is currently permitted for a total of **539 AUMS** sheep use. This equates to 13

³ Bentonite Mine Plan of Operation Update to Wyoming Mining Permit 321C Potato Ridge Block E; WYW-165211; DOI-BLM-WY-R010-2011-0034-EA, FONSI and ROD signed on January 5, 2012.

acres/AUM for public land within the allotment. This does not include 1643 acres classified as Rock Outcrop in the 1984 vegetation inventory (8800 public acres – 1643 acres of Rock Outcrop = 7157 public acres). The 1984 data estimated that **375 AUMS** were present at that time and that potential for the allotment was **645 AUMS**. The Potato Ridge Allotment is predominantly saline upland and shale ecological sites which are characterized by the presence of Gardner’s saltbush with lesser amounts of perennial grasses. These sites lend themselves to sheep use and particularly winter sheep use due to the relative prevalence of shrubs. These sites can be and are grazed by cattle in all seasons.

Current ESDs list suggested stocking rates for cattle based on state and transition models for ecological sites observed within the Potato Ridge Allotment .*

These are:

Saline Upland 5-9 Plant Community

Historic Climax Plant Community	10 acres/AUM
Gardner’s Saltbush/Bottlebrush Squirreltail	12.5 acres/AUM
Gardner’s Saltbush/Bare Ground	20 acres/AUM
Halogeton Plant Community	33 acres/AUM

*Continuous, season-long grazing by cattle under average growing conditions.

Shale 5-9 Plant Community

Historic Climax Plant Community	14 acres/AUM
Perennial Grass/Mixed Shrub	20 acres/AUM
Birdfoot Sagebrush	100 acres/AUM

*Continuous, season-long grazing by cattle under average growing conditions.

3.2.5.3 Direct and Indirect Effects

Alternative 1: No Action

The stocking rate would remain at the currently permitted 539 total AUMS.

Alternative 2: Proposed Action

The majority of the allotment acreage would be classified as *Gardner’s Saltbush/Bare Ground Community* and *Gardner’s saltbush/Bottlebrush Squirreltail Community* states for saline uplands and the *Perennial Grass/Mixed Shrub Plant Community* for the shale sites. Gardner’s Saltbush/Bare Ground and Gardner’s saltbush/Bottlebrush Squirreltail suggested stocking rates are 20 acres/AUM and 12.5 acres/AUM. The suggested stocking rate for the Perennial Grass/Mixed Shrub Plant Community is 20 acres/AUM, which would be a reasonable initial stocking rate for the allotment based on current conditions. This would result in an initial estimated total of 357 AUMS available for grazing use annually. This calculation is based on 7,157 acres of public land within the allotment divided by 20 acres/AUM. This calculation excludes 1643 acres from the 8800 acres of public land in the 1984 vegetation inventory that was classified as Rock Outcrop. Applied to the existing permits, this would result in the following permitted use:

Flitner Limited Partnership	149 cattle	5/1-6/20	100%PL	250 AUMS
Flitner Ranch	64 cattle	5/1-6/20	100%PL	107 AUMS

Alternative 3: Annual Spring Grazing

Same analysis as the Proposed Action.

Alternative 4: No Grazing

Under this alternative no grazing use would be allowed so an appropriate stocking rate would be a moot point since no livestock would be grazing the allotment.

3.2.5.4 Cumulative Effects and Analysis

The Wild Horse Flats Allotment #01504 shares the western boundary with Potato Ridge Allotment and is similar in size at 8,032 acres of public land and 784 acres of private and State of Wyoming lands. The boundary is currently unfenced. The majority of the acreage in Wild Horse Flats would also be classified as *Gardner's Saltbush/Bare Ground* Community and *Gardner's saltbush/Bottlebrush Squirreltail* Community states for saline uplands from field observations. Flitner Limited Partnership currently holds a grazing preference for 58 AUMS of winter sheep use in the Wild Horse Flats Allotment. Their application for additional grazing use in Wild Horse Flats Allotment was approved via Proposed Decision issued April 27, 2012, but no grazing permit was issued at that time pending an allotment resource condition analysis and initial stocking rate determination. Flitner Limited Partnership has made a verbal proposal to change the season of use and kind of livestock from winter sheep use to spring cattle use and to combine the Potato Ridge and Wild Horse Flats allotments into one allotment. Both allotments were categorized as "C" or custodial allotments in the Washakie RMP so monitoring data for this allotment is limited also. Additional field data would need to be collected, but based on the same analysis applied to the Potato Ridge Allotment, an initial stocking rate for the Wild Horse Flats Allotment would be 379 AUMS and prescribed grazing use would be spring use one year followed by two succeeding years of fall/winter use. The potential impacts are expected to be the same as for the Proposed Action for Potato Ridge.

The lands involved in this application have historically been used for livestock grazing, and wildlife habitat. The incremental impacts identified within the four Alternatives, when added to other past, present, and reasonably foreseeable future actions would not significantly contribute to any Cumulative Impacts. Grazing under the proposed permit for the Potato Ridge Allotment would aid in either making progress toward achievement or maintaining achievement of the Rangeland Health Standards, with the understanding that adjustments to grazing management would occur when any of the Standards are not being achieved.

3.2.6 Soils

3.2.6.1 Issue(s) Identified

How would change from sheep to cattle and the changes in season of use impact runoff and erosion?

What would be impacts to soil resource as reflected in Rangeland Health attributes of *Soil-Site Stability* and *Hydrologic Function*?

3.2.6.2 Affected Environment

The soils reflect the desert environment in which they formed. To the extent that the landform and geology are uniform, there is a noticeable homogeneity to the soils. The soils formed over soft, shale bedrock. Soil depths range from very shallow to moderately deep (<10 to 40 inches). Soil textures throughout the profile consist of silty clay loams and clay loams. Soil characteristics vary only in the amount and relative distribution of clay size particles in the

profile, the depth to shale bedrock and to a less extent soil reaction. The Persayo soil series is typical of the soils throughout the Potato Ridge Allotment.

Field observations indicate that Saline Upland 5-9 in. precipitation zone (pz) ecological site (R032XY144WY) is the dominant ecological site across the landscape. Also included is the Shale 5-9 in. pz ecological site (R043BY154WY) which occurs on very shallow (<10 inches) soils formed over soft, friable shale bedrock.

3.2.6.3 **Direct and Indirect Effects**

Alternative 1: No Action

The soils are ranked in Hydrologic Group C and D, indicating that they have slow to very slow rates of infiltration. Nonetheless, when the native vegetation is intact, the soils are not susceptible to runoff and erosion. This is confirmed by the U.S. Forest Service web based Water Erosion Prediction Project (WEPP), Disturbed WEPP Model. Based on WEPP, there is a 4 percent probability of runoff and a 2 percent probability of erosion during any given year. WEPP predicts runoff for a 25-year and 50-year storm cycles to be 1.26 and 2.49 inches respectively. Erosion is only predicted for 50-year storm cycles when 0.59 tons per acre of erosion are predicted. When averaged over a 50-year period, average erosion rates are only 0.01 tons per acre.

A soil loss threshold of 5 tons per acre per year has historically been the established threshold for agricultural lands. Given the arid setting of the Potato Ridge Allotment and the sensitive nature of these soils, a threshold of 2 tons per acre per year has been established. Erosion rates predicted by WEPP are within this threshold.

The soils are stable with few indicators of active erosion. Of the 12 indicators used to evaluate rangeland health with respect to attributes of *Soil & Site Stability* and *Hydrologic Function* (Indicators of Rangeland Health 1 through 11 and 14), few are readily observed across the landscape. These observations confirm the runoff and erosion predictions calculated by WEPP. The ephemeral drainages where runoff is naturally concentrated are stable as evidenced by the presence of sagebrush.

The continuation of winter sheep use would result in few impacts to the soil resource. Though herbaceous species and salt shrubs would continue to be harvested, this this would not occur during the critical growing season. Cover values and bare ground would not change under this alternative. As a result, runoff and erosion would be consistent with the rates predicted by WEPP. The rangeland health attributes of *Soil & Site Stability* and *Hydrologic Function* would remain stable as would the ephemeral drainages.

Alternative 2: Proposed Action

Few impacts to the soil resource are anticipated as a result of the proposed action. By limiting spring grazing to once every three years, the salt shrub and herbaceous component of the plant communities would be able to recover and cover values would remain unchanged. There would be little change to bare ground and cover values. As result, there would be little change to runoff and erosion rates. The rangeland health attributes of *Soil & Site Stability* and *Hydrologic Function* would remain stable as would the ephemeral drainages.

Alternative 3: Annual Spring Grazing

Without the inclusion of a Growing Season Deferred grazing system, annual spring grazing could result in a slight increase in runoff and erosion. Assuming a 20 percent reduction in current cover values, WEPP predicts no changes to the overall probability of runoff and erosion,

though runoff and erosion are predicted to increase. There would still be a 4 percent probability of a runoff 2 percent probability of erosion. WEPP predicts runoff for a 25-year and 50-year storm cycles to be 3.92 inches and 2.44 inches respectively. Erosion is only predicted for 50-year storm cycles when 0.63 tons per acre of erosion are predicted. When averaged over a 50-year period, average erosion rates would still only be 0.01 tons per acre. This could be reflected in the rangeland health attributes of *Soil & Site Stability* and *Hydrologic Function*. Assuming the aforementioned changes in cover values, water flow indicators (rills, waterflow patterns, pedestals and terracettes) could become more common on the landscape. Increased runoff could impact the ephemeral drainages where nick points and head cuts could become more common.

Alternative 4: No Grazing

With the elimination of livestock grazing there could be a slight decrease in runoff and erosion. Assuming a 20 percent increase in current cover values, WEPP predicts a 2 percent probability of runoff and erosion. WEPP predicts runoff for a 50-year storm cycle to be only 2.54 inches. Erosion for 50-year storm cycle would be 0.54 tons per acre of erosion are predicted. When averaged over a 50-year period, average erosion rates would again average 0.01 tons per acre. The rangeland health attributes of *Soil & Site Stability* and *Hydrologic Function* would be less observable and the ephemeral drainages would continue to become more stable further slowing naturally occurring runoff.

3.2.6.4 Cumulative Effects and Analysis

Since grazing impacts would be similar in each alternative, no cumulative impacts are anticipated to the soil resource.

3.2.7 Water Resources (Water Quality and Ground Water, Floodplains, Wetlands and Riparian Zones)

3.2.7.1 Issue(s) Identified

How would the proposed action change hydrologic function of rangeland health in Sheldon Gulch and the Sheldon Gulch sub-watershed?

How and would the reservoirs be impacted?

What would be the change to water consumption needs?

How would change in permit impact surface water quality and the associated beneficial uses?

3.2.7.2 Affected Environment

The Potato Ridge Allotment is located in portions of the Shell Creek and Nowood Creek sub-basins. Within the allotment there are three different 6th level sub-watersheds that are identified by the United States Geological Survey (USGS) by name and Hydrologic Units Codes or (HUC). The area of each sub-watershed and the percent of the sub-watershed that is within the allotment are outlined below in Table 9. The largest drainage is the allotment is Sheldon Gulch that is an ephemeral drainage that has flowing water on average less than 30 days annually, following snow melt and other storm events. The drainage trends in a northwestern direction through the allotment. The Sheldon Gulch sub-watershed has been historically and currently impacted from grazing, along with bentonite mining operations that create surface disturbances from road networks, and installation of culverts along drainage crossings that have modified the surface water hydrology in northern portions of the allotment. The other sub-watersheds contribute to less than 5 percent of their overall sub-watershed areas and do not have sufficient area for statistically significant hydrologic analysis.

Table 9. Sub-watersheds

Sub-Watershed Name- Level #6 (HUC #)	Total (Mi ²)	(Mi ²)within allotment	(%) Mi ² of sub- watershed in the allotment
Sheldon Gulch (100800100205)	45.4	10.95	24
Shell Creek- Sharpen Gulch (10080010206)	43.5	2.41	5
Wild Horse Draw (100800080704)	45.2	0.9	2

There is a low elevation watershed divide that drains into the Wild Horse Draw. The drainages in Wild Horse Draw trend in a southern direction toward Wild Horse Draw and Nowood Creek. All of the sub-watersheds in the allotment are ephemeral watersheds that are situated along lower elevations in the Bighorn Basin. Due to low annual precipitation rates and low elevations, these watersheds produce inflow in the form of surface runoff, into Shell and Nowood creeks for a short duration following snowmelt runoff and following storm events.

The rangeland health indicators for *Hydrologic Function* as observed in 2012 were rated as an overall slight to moderate departure from the reference state. This was given based on erosion indicators, 49 percent bare ground, and other indicators observed surrounding the transect area. The data presented in Tables 4-7 were used to simulate range condition within the NRCS TR-55 Hydrologic Model. The results of which are discussed below in the alternatives.

There are no inventoried riparian or wetlands on public land within the allotment and reservoir areas would not sufficiently meet the US Army Corp of Engineers (USACE) wetland criteria with the exception of Two Doe Reservoir. There is a portion of the Shell Irrigation Ditch that is the source for the water pipeline, as discussed in section 3.2, which is used to fill reservoirs in the allotment. Currently water is diverted from the point of diversion on the ditch to reservoirs via a pipeline to upland reservoir sites. There are eight reservoirs that were constructed as range improvement projects and inventoried for functionality and condition. Reservoirs in the allotment were inventoried in 2012 for functionality and water holding capacity. The Sheldon Ditch, Leader, Thomas Coulee, and Lampman reservoirs were dry and not holding water in July of 2012 (Map 2). The only reservoir holding water during the current year is the Two Doe Reservoir located in section 11 of Township 52 North Range 91 West which is supplemented with canal water and at the end of the project pipeline (Photo 10). This reservoir has received enough supplemental water on a consistent basis and has sufficient hydrology and hydric soil around the perimeter of the reservoir and is considered an artificial wetland with potential to support obligate wetland plant species such as *Carex* and *Juncus* species. The reservoir has a nexus to connected perennial water and would be defined as a “Waters of the US” according to the USACE. The ability of the reservoirs to hold water is dependent on the functionality of the structure, soils, the flow conditions, and storm events of the year. Other reservoirs have sparse amount of limited herbaceous facultative vegetation around the impoundments from periodic events where marginal amounts of water are stored. There are also five other reservoirs that were constructed for watershed sediment retention with water spreaders that are no longer functioning and have no current capacity to impound or spread water. These other reservoirs would not be classified as a wetland or water of the US in their current condition. Sheldon Gulch is rated by the Wyoming Department of Environmental Quality (DEQ) as a class 3B stream and the supported associated beneficial uses are below in Table 10.

Table 10. Wyoming DEQ Designations

WY DEQ Use Designations										
Surface Water Classes	Drinking Water	Game Fish	Non-Game Fish	Fish Consumption	Other Aquatic Life	Recreation	Wildlife	Agriculture	Industry	Scenic Value
2AB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2C	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3B	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Table 11. Daily Water Requirements for Livestock⁴

Type of Livestock	Winter		Summer	
	Imp.Gal./day	L/day	Imp.Gal./day	L/day
Milking cows	17	77	21	95
Cow-calf pairs	11	50	15	68
Dry cows	8	36	12	55
Calves	5	23	8	36
Growing Cattle (400-800 lb. or 180-360 kg.)	5-8	23-36	8-12	36-55
Finishing Cattle (600-1200 lb. or 270-540 kg.)	12	55	19	86
Bulls	8	36	12	55
Horses	8	36	12	55
Sheep	0.8	3.6	3	14

3.2.7.3 Direct and Indirect Effects

Alternative 1: No Action

There is not sufficient background runoff data from Sheldon Gulch in the allotment due to the ephemeral characteristics of Sheldon Gulch. The most effective indicator for hydrologic health and water quality from the runoff is the Hydrologic Function of the rangeland health indicators

⁴ *Stockman's Guide to Range Livestock Watering from Surface Water Sources*. Humbolt, Saskatchewan: Prairie Agricultural Machinery Institute, 1995.

as discussed in the soils section. The management would not change and the current upland condition and trend would continue to be unchanged and rated as slight to moderate as reflected to the Hydrologic Function rangeland health attributes. The hydrologic rangeland indicators would likely remain at their current ratings of slight to moderate departure from historic conditions.

Under this alternative the water needs would be relative to the time and season of use in the permit. The water consumption requirements according to the permit would be primarily sheep utilizing snow during the winter months. During the winter months there is no flow in Sheldon Gulch and the ground has frozen conditions. The channel area would not be disturbed or compacted by animals. The Two Doe Reservoir has a priority level of two (on a scale of 1 being most important and 3 the least) and is listed in the table of reservoirs limited by grazing activity (Washakie Reservoir HMP, 1994). The Two Doe Reservoir would continue to have impacts from hoof action and vegetation removal from permitted grazing around the perimeter of the reservoir.

The water consumption requirements for permitted grazing was analyzed for each alternative by calculating the number of animals (grazing section), water use requirements (Table 11), and season of use. The results for each alternative are located below in Table 12.

Table 12. Water Consumption

Water Use Requirements	Gallons	Acre-Feet
Alternative 1- Winter Sheep	141400	0.43
Alternative 2- Winter Sheep and 1/3 Spring Cattle	172800	0.53
Alternative 3- Spring Cattle	217200	0.63
Alternative 4- No Grazing	0	0

The impacts to water quality are indirect impacts from multiple past and present uses in the affected sub-watersheds. The DEQ class 3B rating for Sheldon Gulch would continue to meet the current designated beneficial uses. There would be no degradation of any water quality parameter for possible impairment under this alternative.

Alternative 2: Proposed Action

Few impacts to the surface water hydrology and the water quality of runoff are anticipated as a result of the proposed action. By reducing permitted grazing amounts and limiting spring grazing to once every three years, the salt shrub and herbaceous component of the plant communities would be able to recover. The rangeland health attributes of Soil & Site Stability and Hydrologic Function would remain in a slight to moderate departure state around upland sites.

The water consumption requirements for the allotment changed in 1997 with the change in kind and season of use. The pipeline was constructed to accommodate these changes and provide for a water source during spring months. Additional water is withdrawn to supplement reservoirs that do not capture sufficient amounts of runoff during dry years. The type and amount of livestock and wildlife use in proximity to the reservoirs in the allotment was changed in 1997 in correlation with the installation of the water pipeline. The water pipeline has since provided additional water and newly emergent vegetation around the perimeters of the Two Doe

Reservoir. The Two Doe Reservoir has a priority level of two and in the table of reservoirs limited by grazing activity (Washakie Reservoir HMP, 1994). The ecological status of this reservoir would continue to be limited by grazing. Under this alternative the wildlife and livestock use around the perimeters of the reservoirs that receive water in the year will continue to occur per the intention of the water development project. Every third year there would be potential for increased use of livestock in the Sheldon Gulch drainage (compared to pre-1997 levels). The drainage swales are more prone to disturbance and compaction in the spring months when water may be present in the channel. The DEQ class 3B rating for Sheldon Gulch would continue to meet the current designated beneficial uses. There would be no degradation of any water quality parameter for potential impairment under this alternative.

Alternative 3: Annual Spring Use

This alternative would have that highest amount of pressure on upland areas in the allotment. The upland hydrologic and runoff indicators, as discussed above in the soils section, could be more expressed in the watersheds within the allotment. The stability of larger drainages in the allotment could slightly decline if upland erosion rates of sheet and rill erosion are increased. Potential for channel bank erosion would occur if upland rangeland condition declines to the point where head cuts and gullies in the allotment destabilize ephemeral channels in the sub-watersheds.

The water quality of surface runoff from the drainages is correlated to upland conditions and could decline if overgrazing or heavy use occurs in the affected sub-watersheds. Sheldon Gulch would likely receive higher rates of disturbance to the drainage area in the spring months under non frozen, wet conditions. The water quality parameters that could be potentially impacted would be from increased amounts of total dissolved solids and increased turbidity in runoff if upland erosion rates increase in the watershed. Using the NRCS TR-55 runoff prediction model, there would be an increase in average of 0.02 cubic feet per second (cfs) per event or 20 acre-feet (af) in total runoff in Sheldon Gulch if range conditions for a desert shrub changed from good to fair condition. The assumptions were made using a 10 year storm event using a Type D hydrologic soil classification and local precipitation estimates. The amounts of sediment delivered downstream as a result of increased runoff are discussed in the soils section. The potential impact to the Two Doe Reservoir under this alternative would be from increased riparian vegetation removal from grazing and hoof action around the perimeter of the reservoir. This alternative would have the highest amount of impact to Two Doe Reservoir compared to the other alternatives. The amounts of hoof action and use would be the highest during the spring. The pipeline would continue to be necessary to fill the reservoir if late spring and summer use would occur.

Alternative 4: No Grazing

With the elimination of livestock grazing there could be a slight decrease in runoff volumes if all the upland areas were to move into a good class condition. Using the NRCS TR-55 Model for a 10 year storm cycle would show an average decrease of 0.02 cfs in runoff per event or 20 acre feet reduction in runoff volume compared to alternative 1. The Sheldon Gulch sub-watershed and Sheldon Gulch would receive less disturbance levels and continue to stabilize with less amounts of runoff compared to the other alternatives. The Two Doe Reservoir would revert to a reservoir with intermittent water and would be limited to capturing runoff following storm events during the year. The operator would not use the pipeline project and the water diverted from the Shell Canal would not be needed to provide livestock water in the allotment. The use around the reservoir would be reduced due to less water in the reservoir.

The DEQ class 3B rating for Sheldon Gulch would continue to meet the current designated beneficial uses. There would be no degradation of any water quality parameter for potential impairment under this alternative.

3.2.7.4 **Cumulative Effects Analysis**

There has been historic and ongoing bentonite mining in the Sheldon Gulch sub-watershed that has had direct impacts to the surface water hydrology. These changes have been from the conversion of native ground cover to a disturbed state and reclaimed to a lower ecological condition. Historic roads and two-tracks have also directly impacted the watershed. However, due to the ephemeral character and lack of baseline water quality data from Sheldon Gulch, exact changes are estimated by the amount of disturbances in the sub-watershed that has increased in correlation to mine activity. The reasonable foreseeable future for the mining impact is limited by geologic outcrops to small areas of the sub-watershed. Also as new areas are mined, previously disturbed mined areas are reclaimed and the cumulative impacts are from acres that are not successfully returned to native conditions.

This action would continue to use of permitted grazing in the Sheldon Gulch sub-watershed. The permit would be altered to allow for improvement in the ecological status of the sub-watershed.

The other permitted use has been from permitted grazing that has an indirect relationship to watershed health and water quality in the sub-watershed. Overall the conditions are related primarily to range condition, soil type and cover. Overall, the alternatives would have no direct cumulative effects to water resources or water quality.

3.2.8 **Fish/Wildlife (Excluding Threatened, Endangered, Candidate and BLM Sensitive Species)**

3.2.8.1 **Issue(s) Identified**

How would the change in kind of livestock grazing affect antelope and mule deer habitat?

Would the change in season of use affect available forage for antelope and mule deer?

3.2.8.2 **Affected Environment**

Wildlife habitat within the allotment has not been designated as crucial for any wildlife species. The allotment is not in a sage grouse core breeding area. The entire allotment is considered suitable as yearlong habitat for antelope and mule deer. The vegetation communities within the allotment can be characterized as sparsely vegetated and identified as Gardner's Saltbush/Indian Ricegrass/Bottlebrush Squirreltail Plant Community, Gardner's Saltbush/Bottlebrush Squirreltail Plant Community, and Gardner's Saltbush/Bare Ground Plant Community (see vegetation section). The main component of these plant communities is Gardner's saltbush. Production in pounds per acres from Gardner's saltbush can vary annually depending on precipitation and temperature variations from 70 lbs/acre to 140 lbs/acre (see Ecological Site Description attached). This would equate from 500,990 lbs/acre to 1,001,980 lbs/acre on Gardner's saltbush for the entire allotment, excluding the 1643 acres classified as Rock Outcrop in the 1984 vegetation inventory, in any given year (these calculations are arrived at by multiplying acres of habitat and lbs/acre).

⁵*Importance to Livestock and Wildlife:*

Gardner's saltbush provides nutritious forage for livestock and various native wildlife species that can be found utilizing habitat within the allotment. Antelope, mule deer, rabbits, and mourning doves browse Gardner's saltbush. Its persistent leaves are an important winter food source for these wildlife species. Gardner's saltbush has been found to be particularly important for domestic sheep when they are grazed during the winter on this vegetation type. It provides the minimum nutritional requirements for maintenance of gestating ewes.

Palatability:

Gardner's saltbush is a generally palatable, year-round food source for livestock and wildlife. In Utah, it has been rated as fair in palatability for cattle, pronghorn, mule deer, and small nongame birds, good for sheep and small mammals, and poor for horses, elk, and waterfowl.

Nutritional Value:

Gardner's saltbush is rated fair in energy and protein values. Crude protein, expressed as percentage of dry matter, averages 7.2 for Gardner's saltbush. Mineral content is as follows:

	Percent Dry Weight				
	P	Fe	K	Ca	Na
Gardner's saltbush (dry site)	0.22	0.14	2.48	1.86	6.21
Gardner's saltbush (irrigated)	0.19	0.12	1.03	1.41	8.46

3.2.8.3 **Direct and Indirect Effects**

Alternative 1: No Action

This alternative would continue winter sheep use of 539 AUMS on 7157 public acres (8800 public acres – 1643 acres of Rock Outcrop = 7157 acres) in the allotment as currently permitted. Sheep would primarily graze on Gardner's saltbush in the allotment during non-growing season, which would reduce the available forage for wintering antelope and mule deer. According to the Washakie RMP, winter sheep grazing and wintering antelope and mule deer may use up to 50 percent of current year's growth (35 lbs/acre to 70 lbs/acre per year). Production of Gardner's saltbush on Gardner's saltbush/bare ground community type is 75-200 lbs/acre and the AUMS/acre = 0.05 making the stocking rate 179 to 358 AUMS for the entire allotment. Therefore based on the recommended stocking rate for Gardner's saltbush/bare ground community type under the No Action Alternative, this season of use and stocking level may not leave adequate forage to accommodate wintering antelope and mule deer. (see Ecological Site Description as attached).

Methodology used was based on the Gardner's saltbush/bare ground community type, assuming equal distribution of animal use and equal production per acre of Gardner's saltbush.

Alternative 2: Proposed Action

This alternative would change the kind of livestock from sheep to cattle, change season of use from non-growing to growing season use (1 in 3 years) and reduce AUMS from 539 to 357 AUMS on 7157 acres of public land in the allotment. Cattle would primarily graze on the herbaceous plants during the growing season such as grasses and forbs; and Gardner's saltbush during the non-growing season. This proposed change in kind of livestock, season of use,

⁵Reed, William R. 1993. *Atriplex gardneri*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, September 25].

rotation of grazing, and reduction of AUMS would likely increase the available forage for antelope and mule deer within the allotment from its current use as described in Alternative 1.

Alternative 3: Annual Spring Use

Light use by cattle (21% to 40%) with total public AUMS reduced and limited to 357 as described in Alternative 3 is well within the 50 percent maximum use level prescribed by the Washakie RMP and would not reduce available forage for antelope and mule deer to a level that would prevent them from utilizing habitat within the allotment on a yearlong basis. Cattle grazing during the growing season will tend to select for grasses and forbs while antelope and mule deer normally select for browse species within the allotment, making competition for available forage between wildlife and domestic livestock unlikely.

Alternative 4: No Grazing

Under the no grazing alternative there would be no consumption of forage by domestic livestock, therefore the available forage for antelope and mule deer would be expected to increase.

3.2.8.4 ***Cumulative Effects Analysis***

None

4 TRIBES, INDIVIDUALS, ORGANIZATIONS, or AGENCIES CONSULTED

Person Consulted	Agency/Tribe/Organization
<i>Stan and Mary Flitner</i>	<i>Permittees</i>
<i>Greg Flitner</i>	<i>Permittee</i>
<i>Kathleen Jachowski</i>	<i>Guardians of the Range</i>
<i>Jim Anderson</i>	<i>Range Consultant for Flitner's</i>

5 LIST OF PREPARERS

The following Worland Field Office personnel reviewed or have been contacted with regard to this EA.

List of Reviewers

Resource	Name	Title
Cultural Resources	Marit Bovee	Archaeologist
Fish/Wildlife (including T&E)	Ted Igleheart	Wildlife Biologist
Recreation/VRM/Travel Management/Special Designations	Paul Rau	Recreation/Visual Specialist
Rangeland/Vegetation	Mike Tietmeyer/Teryl Shryack	Range Management Specialist(s)
T&E Plants	Karen Hepp	Range Management Specialist (T&E/Sensitive Plants)
Soils/Haz. Mat.	Steve Kiracofe	Soils Scientist
Invasive Species	CJ Grimes	NRS/Weeds
Water Resources	Jared Dalebout	Hydrologist
Paleontology	Marit Bovee	Archaeologist
Geology & Minerals	Pam French	Geologist
Land Use/Access	Carol Sheaff	Realty Specialist
Fuels	Eve Warren	NRS

References Cited:

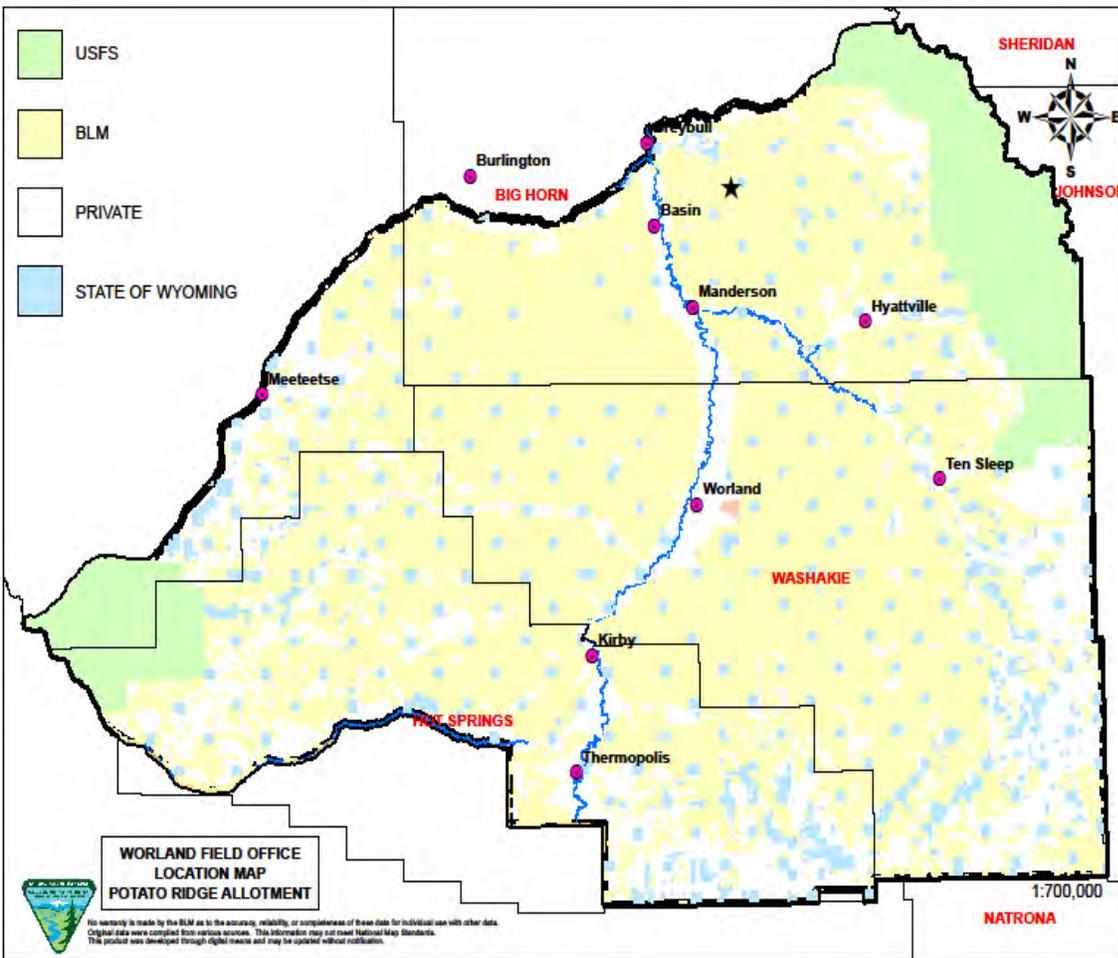
BLM, 1994. Washakie Reservoir Habitat Management Plan. Worland Field Office, Worland Wyoming.

NRCS, 2005. Ecological Site Descriptions Technical Guide. United States Department of Agriculture.

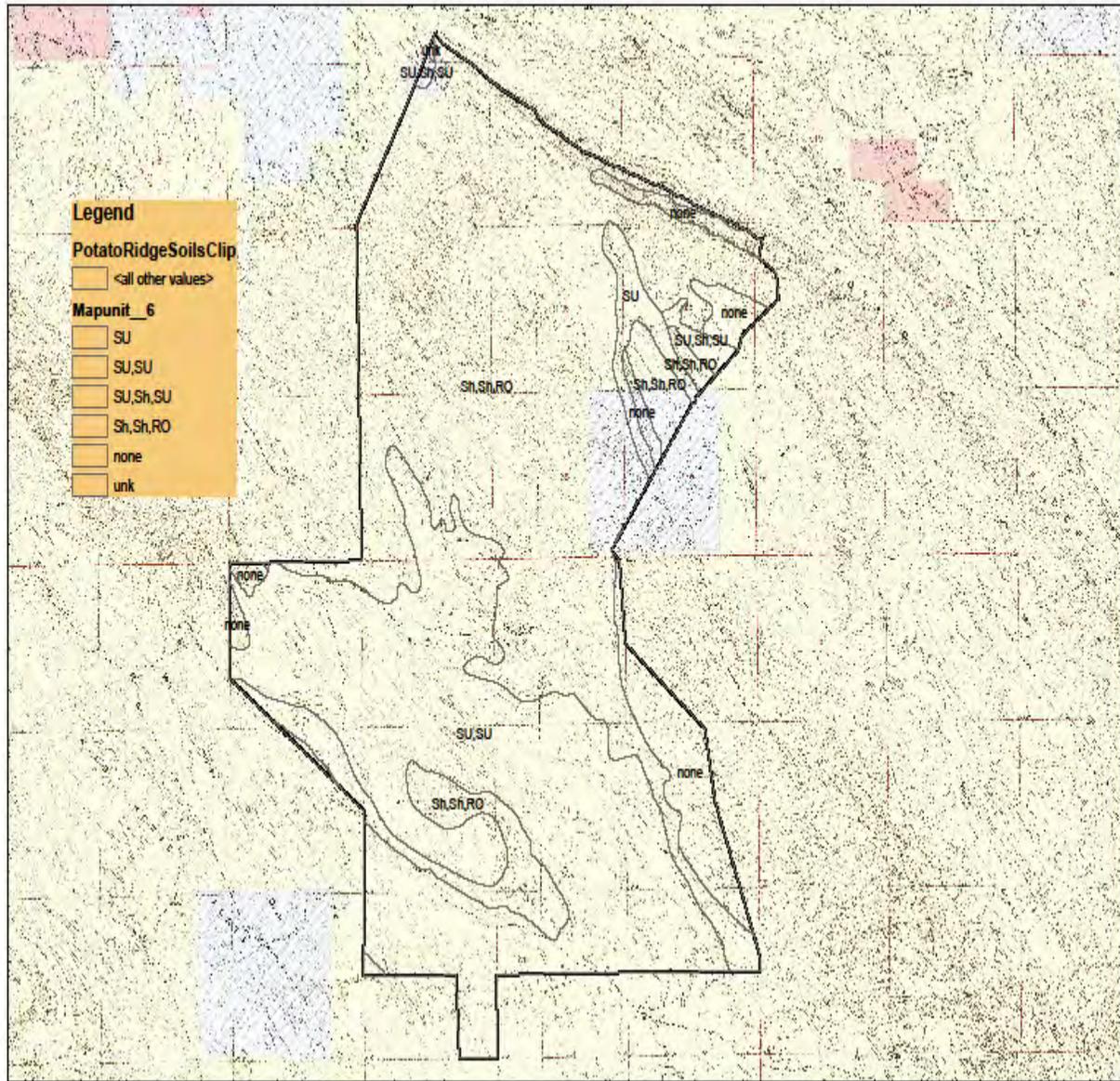
APPENDIX A

MAPS

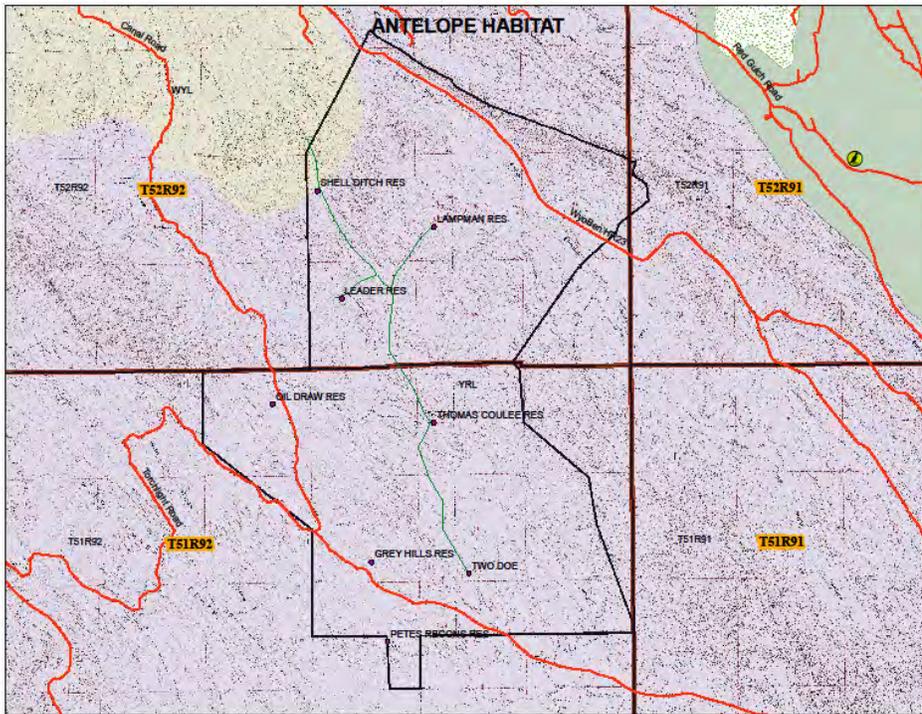
Map 1. Location Map



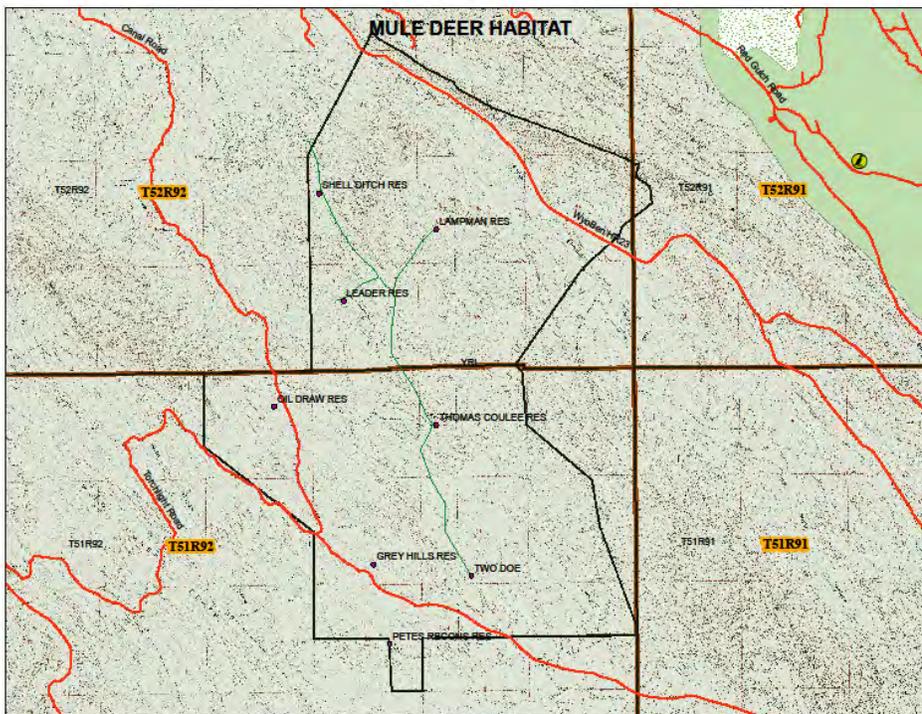
Map 3. Soils



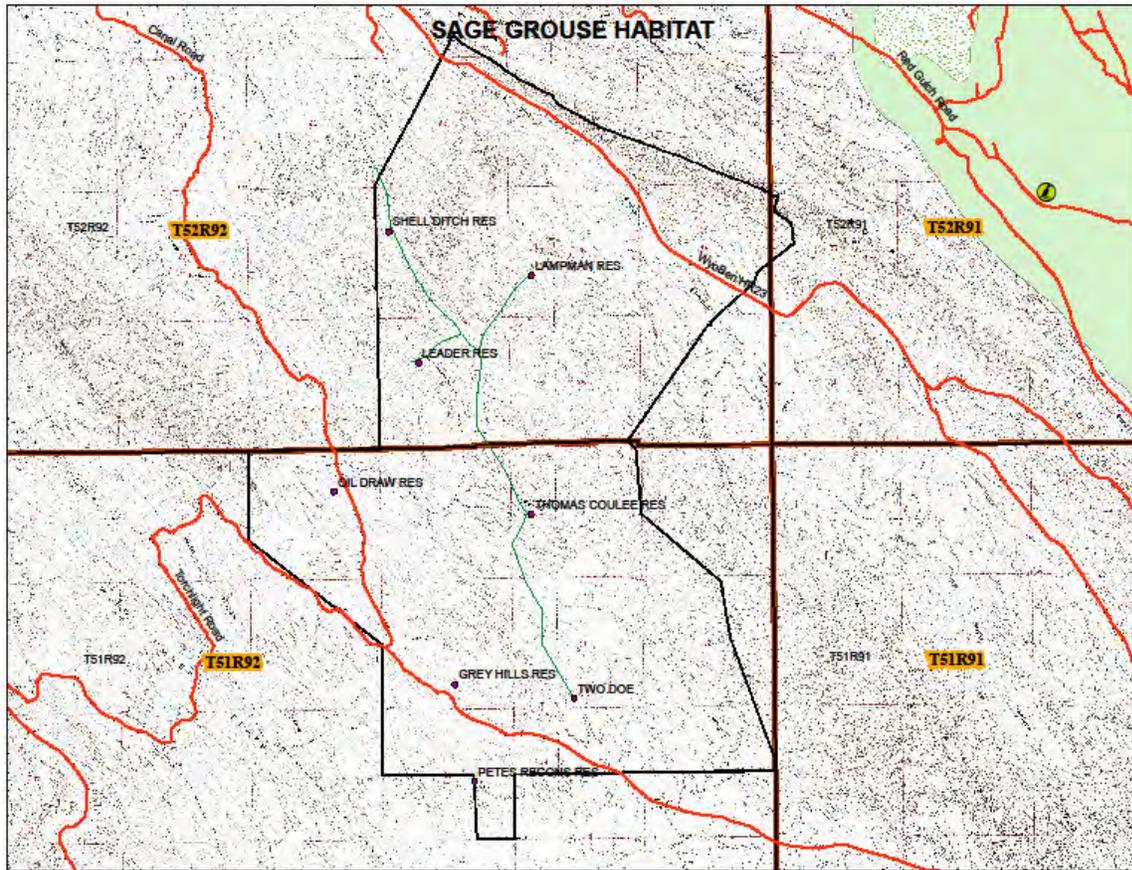
Map 4. Antelope - Yearlong



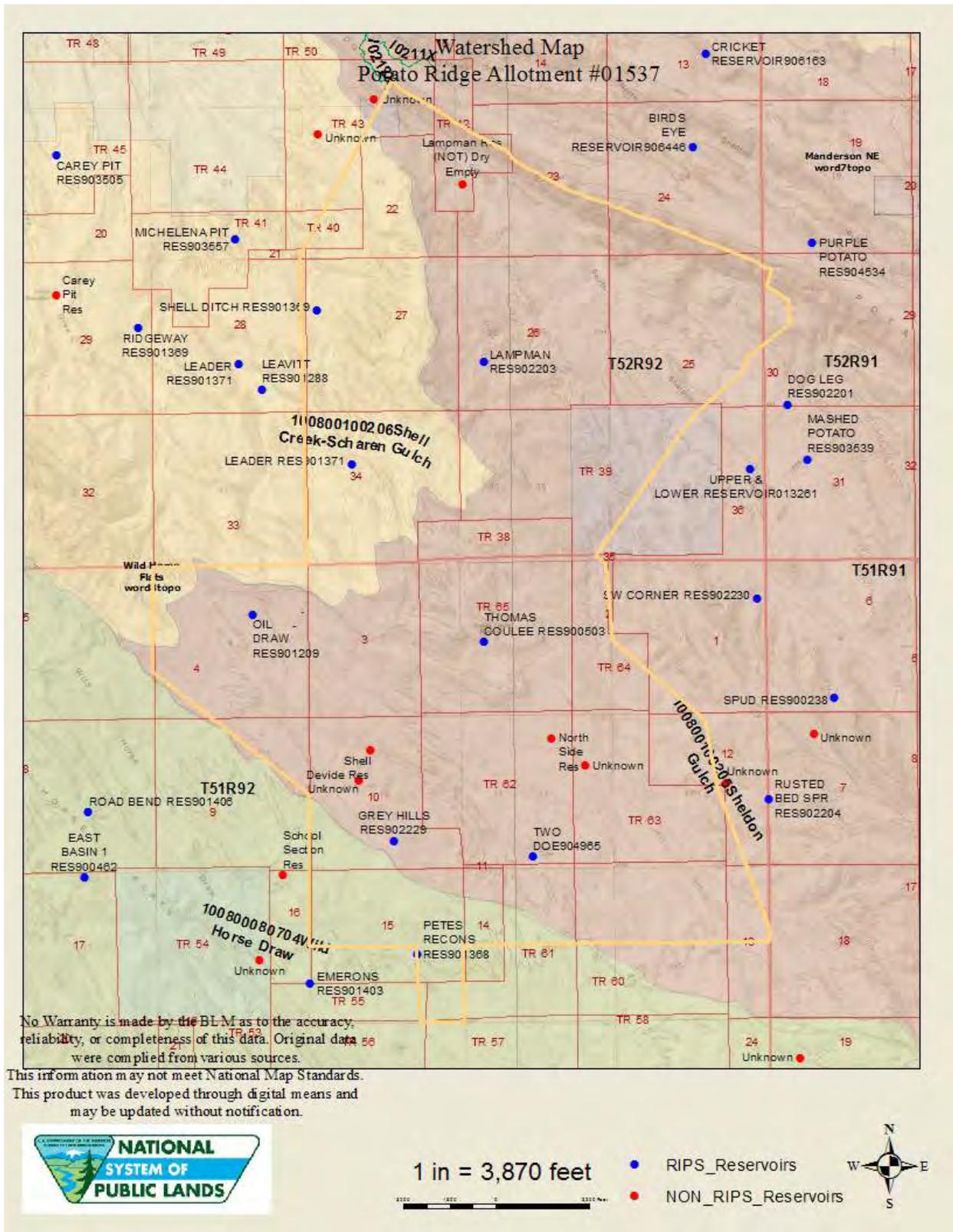
Map 5. Mule Deer - Yearlong



Map 6. Sage Grouse Habitat



Map 7. Watershed Map



APPENDIX B WRITTEN DOCUMENTS

Exhibit 1. Flitner Limited Partnership Letter

April 17, 2012

Worland District Office
Worland, Wyoming 82401

Mike Phillips Mike Tietmeyer, Teryl Shyrak

Please consider this a followup on the meetings and conversations we had in February and March of 2012. I'm anxious to continue our progress in terms of bringing our allotment paperwork up to date. We have had a little interruption due to the death of Jim Anderson's father, and have made allowances as appropriate.

I'm enclosing a copy of a grazing plan using a three-pasture rotation, which we sent to Worland BLM office in 2001, verified mailing date January 11, 2001. Although we never received formal acknowledgement of that document, we proceeded as best we could, making adjustments when necessary.

Our philosophy and use progressed toward more use of AUM's for winter use, which was a positive step. Our rotation pattern has been limited spring use (about 30 days) in Potato Ridge (#1537), then returning the cattle to private pastures for breed-up. (During the dry years, 2004 and 2005 we didn't use #1537 at all.) The spring use of #1537 in this manner allows the Potato Allotment #1525 (Mesa and Red Gulch pastures) a tremendous increase in production during its growing season, thus offering the enhanced winter use in the rotation.

For 2012 our spring use will be Mesa in #1525 Potato Allotment, no use whatsoever in Potato Ridge #1537 at your request. Fall/winter 2012 will be #1525 Red Gulch and Mesa. In 2013, spring use #1537 Potato Ridge, Red Gulch and Mesa #1525 in Fall/winter. In 2014, Red Gulch (#1525) spring, Mesa and Potato (#1537) winter use. For 2015 we would use Potato (1537) in spring and Mesa and Red Gulch in winter, and repeat those patterns. Please consider this our formal Grazing Plan submission, as you requested. We're open to suggestions or discussion.

Our own monitoring has supported the improvement of forage - plant vigor, re-growth, increase in grass species. Most years we have left Potato Ridge (#1537) while there was still soil moisture. In previous years, we were greatly limited on all of these pastures by the scarcity of livestock water, but we've made significant investment in rectifying this as you know. If you would care to take the time, we believe we could show you that our rotation schedule has made sense and has been to the advantage of the resource. Our history of use including this past 11 years since this 2001 plan was submitted, has proven us to be responsible resource managers.

As you know we applied for Permit #1504 in 2006 as we already have AUM's existing in that pasture, and when you re-issue that permit, it will have an effect on our own rotation as we have tentatively presented it.

Please respond when you receive this, and let us know if there is further information you need so that we can bring these permits into a compliance setting for your office.

Sincerely,

Exhibit 1. Flitner Limited Partnership Letter (continued)

Stan Flitner for Diamond Tail Ranch

Cc: Tina Flitner, Kathleen Jachowski, Jir Anderson

Exhibit 2. Flitner Limited Partnership Grazing Proposal



*Stan,
water pipe
on Shapper*

**Diamond Tail Ranch
3541 Ln 32
Greybull, WY 82426**

BLM OFFICE MANAGEMENT
RECEIVED 1/10/01
2001 JAN 10 A 8:53

Draft Grazing Plan for BLM Permit
January 10, 2001

The Grazing Plan involves three pastures, known to us as "Mesa/Sulphur", "Red Gulch" and "Potato" or "Torchlight".

The general plan is for a rotation of Spring Use in one pasture, rest two, using these other two pastures in the fall.

In 2001, Spring Use in Red Gulch. Fall and Winter 2001 and 2002, use Potato and Mesa pastures. Spring use will probably be about 300 AUM's.

In 2002, Spring Use in Mesa/Sulphur with fall and winter use in Potato and Red Gulch.

In 2003, Spring Use in Potato, Fall and Winter use in Mesa and Red Gulch.

Repeat the rotation beginning in spring 2004.

On an AUM basis, according to the records we have from your office, we have approx 1499 AUM's plus the Torchlight 375, then the 55 from the old horse permit which comes off of the permit Flemings now have. We should have about 2000 AUM's, depending on conditions and readiness. Our past use has been determined by conditions and trend, and we have generally not used the full allotment AUM's.

We believe this simple rest rotation schedule would work. As it now stands, the pastures are large enough that with some attention to the water developments, we can encourage grazing in specific parts of a particular pasture depending on where the forage conditions are suitable. In a series of "normal" to "good" years we could actually be using only half of a pasture, creating 5 years of non-use to limited use in the Spring.

Our first priority is to improve the effectiveness of the improvements which are already in place. We think this should be addressed as soon as possible. Stock water is the key management tool in this entire allotment, and of course any management plan must allow flexibility, co-operation and common sense to accommodate unpredictable weather or drought conditions.

Possibilities for eventual improvements that would give us better distribution of livestock, thus improving range or watershed are:

- *Pump water out of Wet Red Basin to the top of the Red Mountain Rims
- *Place storage tank on the Mesa to serve existing waterline and troughs

*Short span of laydown fence or electric fence at the head of what is called the "Mail Trail", which would act as a barrier between Red Basin and Red Gulch, thus creating another pasture or at least a drift fence
(Just discussion items at this time)

Exhibit 2. Flitner Limited Partnership Grazing Proposal (continued)

Regarding the Black Mountain/Mackey pasture area near Trapper Rim, it would be rotated spring one year and fall the next. I would like to suggest some water development work in this pasture too. The BLM referred to as Battle Creek is part of our mountain pasture rotation; there is very little BLM acreage and it is not fenced separately. It is on a high rocky ridge in a corner of the pasture.

Considering the dry conditions we feel that our ranges are in very satisfactory condition. With cooperation, I think that our presence and use will be beneficial to these pastures. Our ranch records, some of which are in your files, show that the animal and plant species diversity and numbers are on the rise; the riparian areas have improved significantly over the past 20 years, and our custodial stewardship has been a positive force in this allotment. Our desire has been to manage our BLM as a part of our ranch management and grazing scheme.

John

I think if we can keep it simple it will work better. If you have any objections or corrections do what ever makes sense of it.

Exhibit 3. Ecological Site Description for Saline Upland (SU) 5-9" Big Horn Basin Precipitation Zone

ESD Printable Report

Page 1 of 27

**UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE**

ECOLOGICAL SITE DESCRIPTION (Old Format Report)

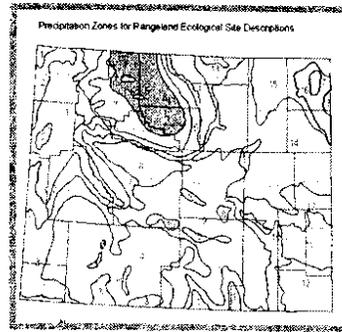
ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Saline Upland (SU) 5-9" Big Horn Basin
Precipitation Zone

Site ID: R032XY144WY

Major Land Resource Area: 032-Northern Intermountain
Desertic Basins



Physiographic Features

This site occurs on nearly level to moderately sloping land.

- Landform:** (1) Hill
(2) Alluvial fan
(3) Stream terrace

	<u>Minimum</u>	<u>Maximum</u>
<u>Elevation (feet):</u>	3700	6000
<u>Slope (percent):</u>	0	15
<u>Water Table Depth (inches):</u>		
<u>Flooding:</u>		
Frequency:	Very rare	Rare
Duration:	Extremely brief	Brief
<u>Ponding:</u>		
Depth (inches):	0	0
Frequency:	None	None
Duration:	None	None

<http://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R032XY144WY&rptLevel=...> 9/18/2012

Runoff Class: Negligible Medium
Aspect: No Influence on this site

Climatic Features

Annual precipitation ranges from 5-9 inches per year. The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the “Emblem” climate station:
 Minimum Maximum 5 yrs. out of 10 between
 Frost-free period (days): 98 171 May 13 – September 19
 Freeze-free period (days): 120 184 May 1– October 5
 Mean Annual Precipitation (inches): 3.22 10.97

Mean annual precipitation: 7.42 inches
 Mean annual air temperature: 45.01 F (31.2 F Avg. Min. to 58.7 F Avg. Max.)
 For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include” Basin”, “Deaver”, “Lovell”, and “Worland”.

	<u>Minimum</u>	<u>Maximum</u>
<u>Frost-free period (days):</u>	98	171
<u>Freeze-free period (days):</u>	120	184
<u>Mean annual precipitation (inches):</u>	5.0	9.0

Monthly precipitation (inches) and temperature (°F):

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Precip. Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Precip. Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Temp. Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temp. Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Climate Stations:

Influencing Water Features

Wetland

Description: System Subsystem Class

Representative Soil Features

The soils of this site are generally from 8" to 20" deep but may exceed 60" in depth. They are well-drained soils formed in alluvium from sodic or alkaline materials. These soils have moderate to slow permeability and are moderately to strongly saline and/or alkaline. The surface soil will vary from 2 to 6 inches in thickness. Some soils may contain more soluble salts in the subsoils than in the surface soils. The soil characteristic having the most influence on the plant community is the high quantity of soluble salts.

Major Soil Series correlated to this site include: Muff, Greybull, Persayo, Uffens, Stutzman, Chipeta, Deaver, Sayles, Cestnik, Torchlight, and Bributte.

Parent Materials:

Kind:

Origin:

Surface Texture: (1) Loam

(2) Very fine sandy loam

(3) Fine sandy loam

Subsurface Texture Group: Clayey

	<u>Minimum</u>	<u>Maximum</u>
<u>Surface Fragments <=3" (% Cover):</u>	0	0
<u>Surface Fragments > 3" (% Cover):</u>	0	0
<u>Subsurface Fragments <=3" (% Volume):</u>	0	0
<u>Subsurface Fragments > 3" (% Volume):</u>	0	0

Drainage Class: Well drained To Well drained

Permeability Class: Slow To Moderate

	<u>Minimum</u>	<u>Maximum</u>
<u>Depth (inches):</u>	8	60
<u>Electrical Conductivity (mmhos/cm):</u>	4	16
<u>Sodium Absorption Ratio:</u>	8	16
<u>Calcium Carbonate Equivalent (percent):</u>	0	15
<u>Soil Reaction (1:1 Water):</u>	7.4	11.0

Soil Reaction (0.01M CaCl₂):

Available Water Capacity (inches): 1.4 6.3

Plant Communities**Ecological Dynamics of the Site**

Potential vegetation on this site is dominated by salt tolerant plants and drought resistant mid cool-season perennial grasses. The expected potential composition for this site is about 50% grasses, 10% forbs and 40% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

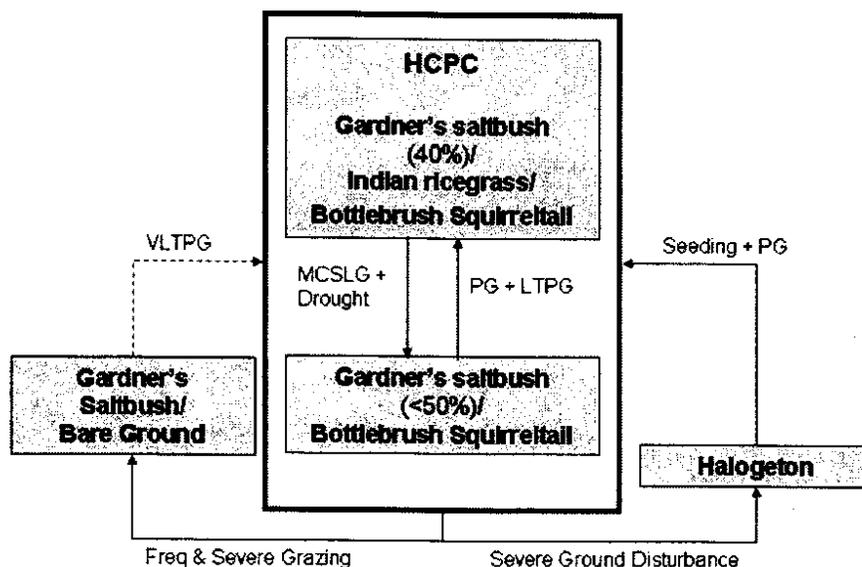
As this site deteriorates, species such as birdfoot sagebrush and greasewood will increase. Weedy annuals will invade. Cool season grasses such as Indian ricegrass, bottlebrush squirreltail, and rhizomatous wheatgrasses will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

Site Type: Rangeland
 MLRA: 32 – Northern Intermountain Desertic Basins

Saline Upland 6-9 P.Z. BH
 032XY144WY



- BM** - Brush Management (fire, chemical, mechanical)
- Freq. & Severe Grazing** - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
- GLMT** - Grazing Land Mechanical Treatment
- LTPG** - Long-term Prescribed Grazing
- MCSLG** - Moderate, Continuous Season-long Grazing
- NU, NF** - No Use and No Fire
- PG** - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)
- VLTPG** - Very Long-term Prescribed Grazing (could possibly take generations)
- WF** - Wildfire

Technical Guide
 Section IIE

USDA-NRCS
 Rev. 11-09-09

Gardner's saltbush/Indian ricegrass/Bottlebrush Squirreltail Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and droughty saline and/or alkali soils. This plant

community can be found on areas that are properly managed with grazing and on areas receiving short periods of rest. Potential vegetation is about 50% grasses or grass-like plants, 10% forbs, and 40% woody plants.

Gardner’s saltbush dominates this state. Other salt tolerant shrubs include greasewood and birdfoot sagebrush. The major grasses include Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, and rhizomatous wheatgrasses. A variety of forbs also occurs in this state and plant diversity is high (see Plant Composition Table).

The total annual production (air-dry weight) of this state is about 350 pounds per acre, but it can range from about 200 lbs. /acre in unfavorable years to about 550 lbs. /acre in above average years.

This state is fragile, but well adapted to the Northern Intermountain Desertic Basins climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community, but is difficult to reestablish when damaged. (Site/soil stability, watershed function, and biologic integrity).

Transitions or pathways leading to other plant communities are as follows:

- Moderate, Continuous Season-Long grazing will convert this plant community to the Gardner’s Saltbush/Bottlebrush Squirreltail Plant Community.
- Severe ground disturbance will convert this state to the Halogeton Plant Community.

Gardner’s saltbush/Indian ricegrass/Bottlebrush Squirreltail Plant Community Plant Species Composition:

Grass/Grasslike					Annual Production in Pounds Per Acre	
Group	Group Name	Common Name	Symbol	Scientific Name	Low	High
1		Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	53	105
2		squirreltail, bottlebrush squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	53	105
3		western wheatgrass	PASM	<i>Pascopyrum smithii</i>	18	35
4		Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	POSE	<i>Poa secunda</i>	0	18
5		Grass, perennial, other perennial grass	2GP		0	18
	Forb				Annual Production in Pounds Per Acre	

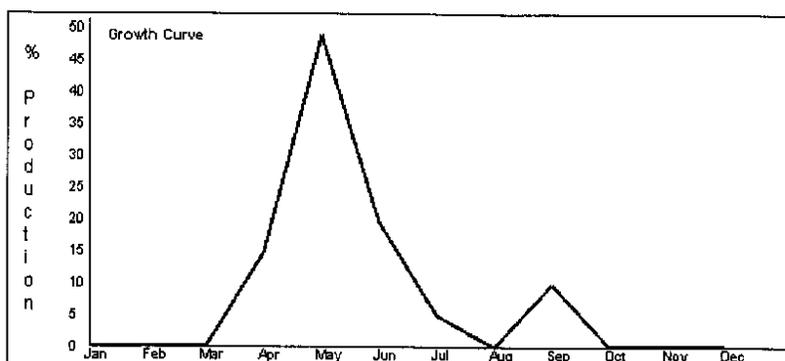
<u>Group</u>	<u>Group Name</u>	<u>Common Name</u>	<u>Symbol</u>	<u>Scientific Name</u>	<u>Low</u>	<u>High</u>
6		Forb, perennial, other perennial forb	2FP		4	35
		textile onion	ALTE	<i>Allium textile</i>	0	18
		milkvetch	ASTRA	<i>Astragalus</i>	0	18
		salsify	TRPO	<i>Trigonogon porrifolius</i>	0	18
		woodyaster	XYLOR	<i>Xylorhiza</i>	0	18

<u>Shrub/Vine</u>					<u>Annual Production in Pounds Per Acre</u>	
<u>Group</u>	<u>Group Name</u>	<u>Common Name</u>	<u>Symbol</u>	<u>Scientific Name</u>	<u>Low</u>	<u>High</u>
7		Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	70	140
8		bud sagebrush	PICRO	<i>Picrothammus</i>	0	35
9		Shrub (>.5m)	2SHRUB		0	18
		birdfoot sagebrush	ARPE6	<i>Artemisia pedatifida</i>	0	18
		winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0	18
		greasewood	SAVE4	<i>Sarcobatus vermiculatus</i>	0	18

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

<u>Percent Production by Month</u>											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Gardner's Saltbush/Bottlebrush Squirreltail Plant Community

Historically, this plant community evolved under grazing by large ungulates. Currently this vegetation state is found under moderate season-long grazing by livestock. Prolonged drought can also play an important role and will exacerbate these conditions. Gardner's saltbush and bottlebrush squirreltail are major components of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs.

Dominant grasses include bottlebrush squirreltail and Sandberg bluegrass. Forbs commonly found in this plant community include Smooth woodyaster, Cous biscuitroot, Wild onion, and leafy wildparsley. Plains pricklypear and winterfat can also occur.

When compared to the Historic Climax Plant Community, birdfoot sagebrush has increased. Indian ricegrass has decreased and may occur in only trace amounts. In addition, winterfat may or may not have changed depending on the season of use.

The total annual production (air-dry weight) of this state is about 250 pounds per acre, but it can range from about 150 lbs. /acre in unfavorable years to about 350 lbs. /acre in above average years.

This plant community is relatively resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Water flow patterns and litter movement may occur, but is not extensive. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is intact.

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing will prevent further deterioration and over the long-term may return this state to near Historic Climax Plant Community.
- Frequent and severe grazing will convert this state to Gardner Saltbush/Bare Ground Plant Community.

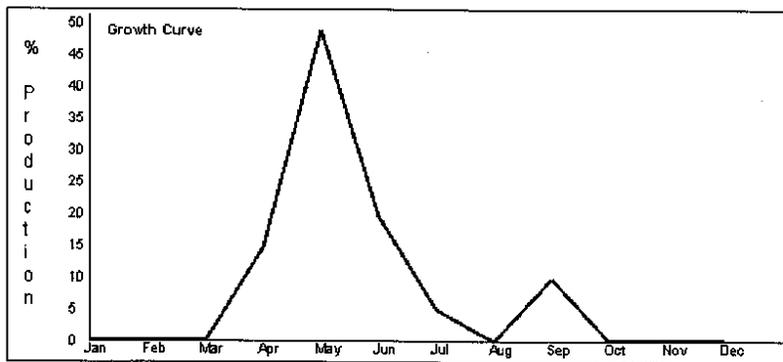
- Severe ground disturbance will convert this state to the Halogeton Plant Community.

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Gardner's Saltbush/Bare Ground Plant Community

This plant community can occur where sites are subjected to continuous yearlong grazing. Gardner's saltbush dominates this state and in some cases comprises almost 100% of the plant community. The interspaces between plants have expanded significantly leaving the amount of bare ground prevalent and the soil surface exposed to erosive elements.

Cool season grasses have been eliminated or greatly reduced. Noxious weeds such as Russian knapweed and halogeton may invade into the large openings. When compared to the HCPC, plant production is greatly diminished due to the excessive amount of bare ground.

The total annual production (air-dry weight) of this state is about 100 pounds per acre, but it can range from about 75 lbs./acre in unfavorable years to about 200 lbs./acre in above average years.

This plant community is resistant to change as the stand becomes more decadent. These areas may actually be more resistant to fire as less fine fuels are available and the bare ground between the sagebrush plants is increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the plant composition or structure of the plant community. Plant diversity is

extremely low. The plant vigor is diminished and replacement capabilities are severely reduced due to the decrease in the number of cool-season grasses. Plant litter is noticeably less when compared to the HCPC.

Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff is increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope.

Transitional pathways leading to other plant communities are as follows:

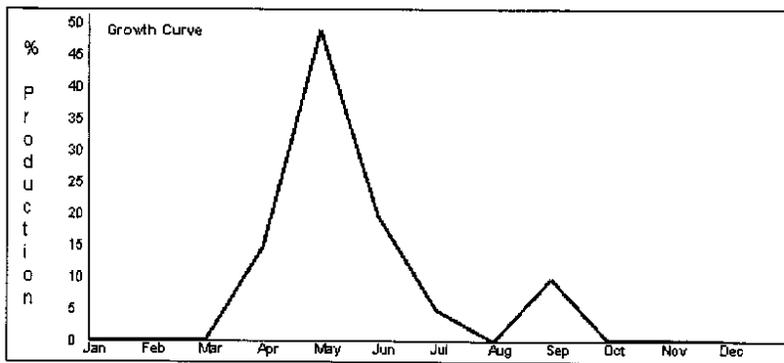
- Very long term prescribed grazing may eventually return this plant community at or near the HCPC.
- Severe ground disturbance will convert this state to the Halogeton Plant Community.

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Halogeton Plant Community

This plant community is a result of severe ground disturbance. Halogeton, bottlebrush squirreltail, and bare ground are a major part of this state. Sparse saline tolerant grasses can be found in the understory with the balance made up of annual forbs.

The total annual production (air-dry weight) of this state is about 75 pounds per acre, but it can range from about 50 lbs./acre in unfavorable years to about 150 lbs./acre in above average years.

The state is vulnerable to excessive erosion. The biotic integrity of this plant community is at risk depending on how far a shift has occurred in plant composition toward halogeton and annual forbs. The watershed is at risk as bare ground increases.

Transitional pathways leading to other plant communities are as follows:

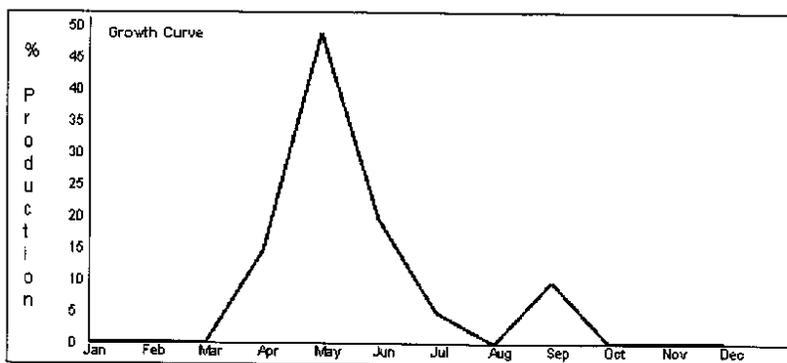
- Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this plant community to near Historic Climax Plant Community (Gardner's Saltbush/Bunchgrass State) although halogeton will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Ecological Site Interpretations

Animal Community:
 Animal Community – Wildlife Interpretations

Historic Climax Plant Community: The predominance of woody plants in this plant community provides winter grazing for mixed-feeders, such elk, and antelope. Suitable thermal and escape cover for these animals are limited due to the low quantities of tall woody plants. When found adjacent to sagebrush-dominated states, this plant community may provide lek sites for sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Some grassland obligate small mammals would occur here.

Gardner's Saltbush/Bottlebrush Squirreltail Plant Community: The combination of shrubs, grasses, and forbs can provide a forage source for large animals. Suitable thermal and escape cover for these animals are limited due to the low quantities of tall woody plants. When found adjacent to sagebrush dominated states, this plant community may provide lek sites for sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Some grassland obligate small mammals would occur here.

Gardner's Saltbush/Bare Ground Plant Community: This plant community exhibits a low level of plant species diversity. It may provide some forage value for antelope, but in most cases it is not a desirable plant community to select as a wildlife habitat management objective.

Halogeton Plant Community: This plant community exhibits a low level of plant species diversity. It is not a desirable plant community to select as a wildlife habitat management objective.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*

(lb. /ac) (AUM/ac)

Historic Climax Plant Community 200-550 .10

Gardner's Saltbush/Bottlebrush Squirreltail 150-350 .08

Gardner's Saltbush/Bare Ground 75-200 .05

Halogeton Plant Community 50-150 .03

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Plant Preference by Animal Kind:

Animal Kind: ALL Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
threeawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red threeawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush, paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush, green rabbitbrush, low rabbitbrush, Douglas rabbitbrush	<u><i>Chrysothamnus viscidiflorus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
pale bastard toadflax	<u><i>Comandra umbellata ssp. pallida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u><i>Deschampsia caespitosa(svn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
larkspur	<u><i>Delphinium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland saltgrass	<u><i>Distichlis spicata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Canada wildrye	<u><i>Elymus canadensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
squirreltail, bottlebrush	<u><i>Elymus elymoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass	<u><i>Elymus lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass, thickspike	<u><i>Elymus lanceolatus ssp. lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
slender wheatgrass	<u><i>Elymus trachycaulis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
horsetail	<u><i>Equisetum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
fleabane	<u><i>Erigeron</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
buckwheat	<u><i>Eriogonum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
rubber rabbitbrush	<u><i>Ericameria nauseosa</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
aster	<u><i>Eucephalus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
spiny hopsage	<u><i>Grayia spinosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
needle and thread, needleandthread	<u><i>Hesperostipa comata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

iris	<u><i>Iris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Baltic rush	<u><i>Juncus balticus(syn)</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Rocky Mountain juniper	<u><i>Juniperus scopulorum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
prairie Junegrass	<u><i>Koeleria macrantha</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
winterfat	<u><i>Krascheninnikovia lanata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
basin wildrye	<u><i>Levmus cinereus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
desertparsley, biscuitroot	<u><i>Lomatium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
tufted evening-primrose	<u><i>Oenothera caespitosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
nailwort	<u><i>Paronychia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
western wheatgrass	<u><i>Pascopyrum smithii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beardtongue, penstemon	<u><i>Penstemon</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
phlox	<u><i>Phlox</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bud sagebrush, bud sagewort	<u><i>Picrothamnus desertorum</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Animal Kind: all Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
Sandberg bluegrass	<u><i>Poa juncifolia(syn)</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Animal Kind: ALL Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
cottonwood	<u><i>Populus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	<u><i>Poa secunda</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
bluebunch wheatgrass	<u><i>Pseudoroegneria spicata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Nuttall's alkaligrass	<u><i>Puccinellia nuttalliana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
skunkbush sumac	<u><i>Rhus trilobata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u><i>Salix</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
stonecrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: All Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: ALL Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: all Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: ALL Antelope																			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>					
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T

stemless four-nerve daisy	<u><i>Tetranervis acaulis var. acaulis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u><i>Yucca</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threeawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red threeawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush, paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush, green rabbitbrush, low rabbitbrush, Douglas rabbitbrush	<u><i>Chrysothamnus viscidiflorus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pale bastard toadflax	<u><i>Comandra umbellata ssp. pallida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u><i>Deschampsia caespitosa(syn)</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
larkspur	<u><i>Delphinium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland saltgrass	<u><i>Distichlis spicata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Canada wildrye	<u><i>Elymus canadensis</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
squirreltail, bottlebrush squirreltail	<u><i>Elymus elymoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass	<u><i>Elymus lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass, thickspike wheatgrass	<u><i>Elymus lanceolatus ssp. lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
slender wheatgrass	<u><i>Elymus trachycaulus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

horsetail	<u><i>Equisetum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
fleabane	<u><i>Erigeron</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
buckwheat	<u><i>Eriogonum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
rubber rabbitbrush	<u><i>Ericameria nauseosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
aster	<u><i>Eucephalus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
spiny hopsage	<u><i>Grayia spinosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
needle and thread, needleandthread	<u><i>Hesperostipa comata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
iris	<u><i>Iris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Baltic rush	<u><i>Juncus balticus(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Rocky Mountain juniper	<u><i>Juniperus scopulorum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
prairie Junegrass	<u><i>Koeleria macrantha</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
winterfat	<u><i>Krascheninnikovia lanata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
basin wildrye	<u><i>Leymus cinereus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
desertparsley, biscuitroot	<u><i>Lomatium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
tufted evening- primrose	<u><i>Oenothera caespitosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
nailwort	<u><i>Paronychia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
western wheatgrass	<u><i>Pascopyrum smithii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beardtongue, penstemon	<u><i>Penstemon</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
phlox	<u><i>Phlox</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bud sagebrush, bud sagewort	<u><i>Picrothammus desertorum</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: all Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Sandberg bluegrass	<u><i>Poa juncifolia(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
cottonwood	<u><i>Populus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	<u><i>Poa secunda</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
bluebunch wheatgrass	<u><i>Pseudoroegneria spicata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Nuttall's alkligrass	<u><i>Puccinellia nuttalliana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
skunkbush sumac	<u><i>Rhus trilobata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u><i>Salix</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
stonecrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: All Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: ALL Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: all Cattle																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: ALL Cattle																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve																
daisy	<u><i>Tetranneuris acaulis var. acaulis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u><i>Yucca</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: ALL Deer																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain																
dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
threecawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threecawn, red																
threecawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush,																
paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush,																
green rabbitbrush, low																
rabbitbrush, Douglas																
rabbitbrush	<u><i>Chrysothamnus viscidiflorus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
pale bastard toadflax	<u><i>Comandra umbellata ssp. pallida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u><i>Deschampsia caespitosa(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
larkspur	<u><i>Delphinium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
inland saltgrass	<u><i>Distichlis spicata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U

blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: All Deer															
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>	
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
Animal Kind: ALL Deer															
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>	
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
Animal Kind: all Deer															
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>	
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
Animal Kind: ALL Deer															
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>	
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	
stemless four-nerve daisy	<u><i>Tetaneuris acaulis var. acaulis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	
yucca	<u><i>Yucca</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
Animal Kind: ALL Horses															
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>	
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
threecawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
Fendler threecawn, red threecawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
inland sedge	<u><i>Carex interior</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	
Indian paintbrush, paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	

skunkbush surnac	<u><i>Rhus trilobata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u><i>Salix</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
stonecrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: All Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: ALL Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: all Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T

stemless four-nerve daisy	<u><i>Tetaneuris acutis var. acutis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u><i>Yucca</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: ALL Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threecawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threecawn, red threecawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Recreational Uses:

This site provides some hunting opportunities for upland game species.

Wood Products:

No appreciable wood products are present on the site.

Other Products:

None noted.

Other Information:

Supporting Information

Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Impervious Clay (IC) 5-9" Big Horn Basin Precipitation Zone	R032XY118WY	
Loamy (Ly) 5-9" Big Horn Basin Precipitation Zone	R032XY122WY	

Similar Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Saline Upland (SU) 10-14" East Precipitation Zone	R032XY344WY	Saline Upland 10-14" Foothills and Basins East P.Z., 032XY344WY has higher production.

State Correlation:

This site has been correlated with the following states:
WY

Inventory Data References:

Information presented here has been derived from NRCS inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source Number of Records Sample Period State County
SCS-RANGE-417 19 1965-1986 WY Park & others

Type Locality:

Relationship to Other Established Classifications:

Other References:

Site Description Approval:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Ray Gullion	8/12/2005	E. Bainter	5/21/2008

Reference Sheet

Author(s)/participant(s): Ray Gullion

Contact for lead author: ray.gullion@wy.usda.gov

Date: 2/19/2008 **MLRA:** 032X **Ecological Site:** Saline Upland (SU) 5-9" Big Horn Basin Precipitation Zone R032XY144WY This *must* be verified based on soils and climate (see Ecological Site Description). Current plant community cannot be used to identify the ecological site.

Composition (indicators 10 and 12) based on: XAnnual Production, Foliar Cover, Biomass

Indicators. For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above- and below-average years for **each** community and natural disturbance regimes within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. **Number and extent of rills:** Rills should not be present

2. **Presence of water flow patterns:** Barely observable

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

4. **Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground):** Bare ground is 30-40%

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites**

will show a range of values): Plant cover and litter is at 50% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 4 or greater.

-
9. **Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon
-
10. **Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is slow to moderate.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be present.
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:**
 Dominant:
 Sub-dominant:
 Other:
 Additional: Mid stature Grasses > Shrubs > Forbs > Short stature Grasses
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low
-
14. **Average percent litter cover (10-15% %) and depth (0.1-0.25 inches):**
-
15. **Expected annual production (this is TOTAL above-ground production, not just forage production):** 300 lbs/ac
-
16. **Potential invasive (including noxious) species (native and non-native). List Species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicator, we are describing what in NOT expected in the reference state for the ecological site:** Birdfoot sagebrush, greasewood, Unpalatable forbs, Annuals, Exotics, and Species found on Noxious Weed List
-
17. **Perennial plant reproductive capability:** All species are capable of reproducing
-

Reference Sheet Approval:

Approval

Date

E. Bainter

5/2/2008

<http://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R032XY144WY&rptLevel=...> 9/18/2012

Exhibit 4. . Ecological Site Description for Shale (Sh) 5-9” Big Horn Basin Precipitation Zone

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION (Old Format Report)

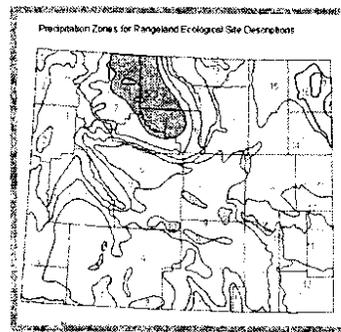
ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Shale (Sh) 5-9” Big Horn Basin Precipitation Zone

Site ID: R032XY154WY

Major Land Resource Area: 032-Northern Intermountain
Desertic Basins



Physiographic Features

This site occurs on moderate to steep slopes and ridge tops.

- Landform:** (1) Hill
 (2) Ridge
 (3) Escarpment

	<u>Minimum</u>	<u>Maximum</u>
<u>Elevation (feet):</u>	3700	6000
<u>Slope (percent):</u>	0	60
<u>Water Table Depth (inches):</u>		
<u>Flooding:</u>		
Frequency:	None	None
Duration:	None	None
<u>Ponding:</u>		
Depth (inches):	0	0
Frequency:	None	None
Duration:	None	None

Runoff Class: Negligible High
Aspect: No Influence on this site

Climatic Features

Annual precipitation ranges from 5-9 inches per year. The normal precipitation pattern shows peaks in May and June and a secondary peak in September. This amounts to about 50% of the mean annual precipitation. Much of the moisture that falls in the latter part of the summer is lost by evaporation and much of the moisture that falls during the winter is lost by sublimation. Average snowfall is about 20 inches annually. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation.

Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

High winds are generally blocked from the basin by high mountains, but can occur in conjunction with an occasional thunderstorm.

Growth of native cool-season plants begins about April 1 and continues to about July 1. Cool weather and moisture in September may produce some green up of cool season plants that will continue to late October.

The following information is from the "Emblem" climate station:
 Minimum Maximum 5 yrs. out of 10 between
 Frost-free period (days): 98 171 May 13 – September 19
 Freeze-free period (days): 120 184 May 1 – October 5
 Mean Annual Precipitation (inches): 3.22 10.97

Mean annual precipitation: 7.42 inches
 Mean annual air temperature: 45.01 F (31.2 F Avg. Min. to 58.7 F Avg. Max.)
 For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include "Basin", "Deaver", "Lovell" and "Worland".

	<u>Minimum</u>	<u>Maximum</u>
<u>Frost-free period (days):</u>	98	171
<u>Freeze-free period (days):</u>	120	184
<u>Mean annual precipitation (inches):</u>	5.0	9.0

Monthly precipitation (inches) and temperature (°F):

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Precip. Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Precip. Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Temp. Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temp. Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Climate Stations:

Influencing Water Features

Wetland

Description: System Subsystem Class

Representative Soil Features

The soils of this site are very shallow (less than 8 inches to bedrock) well-drained soils formed from residuum. These soils have rapid to slow permeability and can be of any texture. This site usually occurs on steep slopes with many outcrops of shale bedrock. These clay shales are usually saline or alkaline in various degrees, and normally produce sparse stands of halophytes and saline tolerant grasses. The soil characteristics having the most influence on the plant community are the very shallow soils, which drastically reduces the amount of available moisture and potential quantities of soluble salts.

Parent Materials:

Kind:

Origin:

Surface Texture: (1) Clay loam

(2) Loam

(3) Silt loam

Subsurface Texture Group: Loamy

	<u>Minimum</u>	<u>Maximum</u>
<u>Surface Fragments <=3" (% Cover):</u>	0	10
<u>Surface Fragments > 3" (% Cover):</u>	0	10
<u>Subsurface Fragments <=3" (% Volume):</u>	5	20
<u>Subsurface Fragments > 3" (% Volume):</u>	0	0

Drainage Class: Well drained To Well drained

Permeability Class: Slow To Moderate

	<u>Minimum</u>	<u>Maximum</u>
<u>Depth (inches):</u>	1	8
<u>Electrical Conductivity (mmhos/cm):</u>	4	16
<u>Sodium Absorption Ratio:</u>	0	13
<u>Calcium Carbonate Equivalent (percent):</u>	0	5
<u>Soil Reaction (1:1 Water):</u>	6.6	8.4
<u>Soil Reaction (0.01M CaCl2):</u>		

Available Water Capacity (inches): 0.6 2.0

Plant Communities

Ecological Dynamics of the Site

Potential vegetation on this site is dominated by salt tolerant plants and drought resistant mid cool-season perennial grasses. The expected potential composition for this site is about 60% grasses, 15% forbs and 25% woody plants. The composition and production will vary naturally due to historical use, fluctuating precipitation and fire frequency.

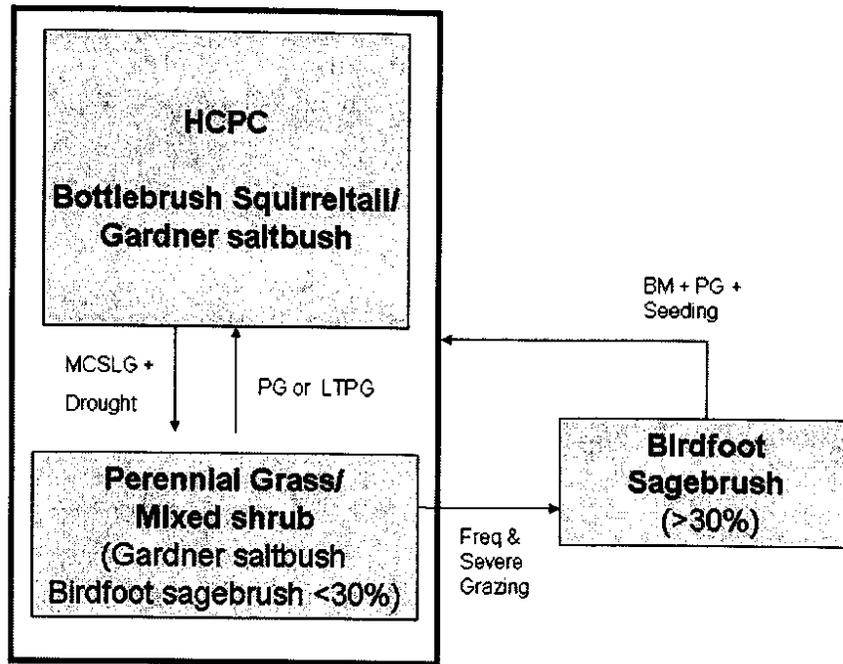
As this site deteriorates, species such as short warm-season grasses, birdfoot sagebrush and woodyaster will increase. Plains pricklypear and weedy annuals will invade. Cool season grasses such as bluebunch wheatgrass, Indian ricegrass and western wheatgrass will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

Site Type: Rangeland
 MLRA: 32 - Northern Intermountain Desertic Basins

Shale 5-9 P.Z. BH
 032XY154WY



- BM** - Brush Management (fire, chemical, mechanical)
- Freq. & Severe Grazing** - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season
- GLMT** - Grazing Land Mechanical Treatment
- LTPG** - Long-term Prescribed Grazing
- MCSLG** - Moderate, Continuous Season-long Grazing
- NU, NF** - No Use and No Fire
- PG** - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)
- VLTPG** - Very Long-term Prescribed Grazing (could possibly take generations)
- WF** - Wildfire

Technical Guide
 Section IIE

USDA-NRCS
 Rev. 08-12-05

Bottlebrush Squirreltail/Gardner's Saltbush Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state

<http://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R032XY154WY&rptLevel=...> 9/18/2012

evolved with grazing by large herbivores and droughty soils due to the shallow depth to undeveloped salty weathered shale material. Historically, fire has not played an important role in this state due to the naturally sparse vegetation, which prohibits the spread of fire. Potential vegetation is about 60% grasses, 15% forbs, and 25% woody plants. Cool season midgrasses dominate the state.

The major grasses include bluebunch wheatgrass, Indian ricegrass, bottlebrush squirreltail, and rhizomatous wheatgrasses. Other grasses occurring in this state include alkali sacaton, blue grama, and Sandberg bluegrass. Gardner’s saltbush and winterfat are conspicuous elements of this state. A variety of forbs also occur in this state and plant diversity is high (see Plant Composition Table).

The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 85 lbs. /acre in unfavorable years to about 250 lbs. /acre in above average years.

The state is fragile and adapted to the Northern Intermountain Desertic Basins climatic conditions. The diversity in plant species allows for some drought resistance. This is a sustainable plant community, but is difficult to reestablish when damaged. (Site/soil stability, watershed function, and biologic integrity).

Transitions or pathways leading to other plant communities are as follows:

- Moderate, Continuous Season-Long grazing will convert this plant community to the Perennial Grass/Mixed Shrub Plant Community. Prolonged Drought will exacerbate this transition.

Bottlebrush Squirreltail/Gardner’s Saltbush Plant Community Plant Species Composition:

Grass/Grasslike					Annual Production in Pounds Per Acre	
Group	Group Name	Common Name	Symbol	Scientific Name	Low	High
1		squirreltail, bottlebrush squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	23	45
2		western wheatgrass	PASM	<i>Pascopyrum smithii</i>	15	30
3		Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	8	23
4		Grass, perennial, other perennial grass	2GP		0	15
		blue grama	BOGR2	<i>Bouteloua gracilis</i>	0	8
		Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	POSE	<i>Poa secunda</i>	0	8
		bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0	8
		alkali sacaton	SPA1	<i>Sporobolus airoides</i>	0	8

Forb					Annual Production in Pounds Per Acre	
Group	Group Name	Common Name	Symbol	Scientific Name	Low	High

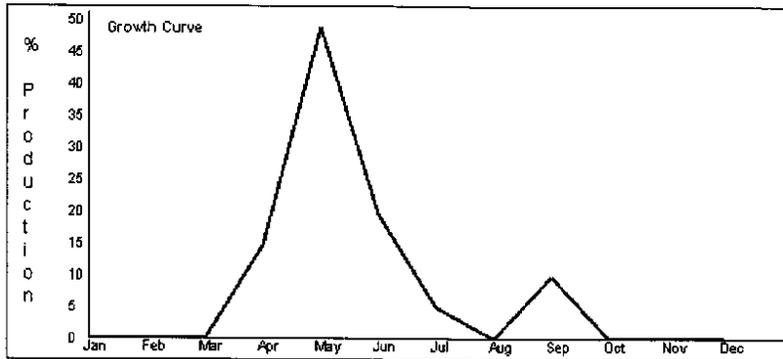
5					0	8
	Forb, perennial, other		2FP		0	8
	perennial forb				0	8
	milkvetch	ASTRA	<i>Astragalus</i>		0	8
	princesplume	STANL	<i>Stanleya</i>		0	8
	woodyaster	XYLOR	<i>Xylorhiza</i>		0	8

Shrub/Vine					Annual Production in Pounds Per Acre	
<u>Group</u>	<u>Group Name</u>	<u>Common Name</u>	<u>Symbol</u>	<u>Scientific Name</u>	<u>Low</u>	<u>High</u>
6		Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	23	45
7		birdfoot sagebrush	ARPE6	<i>Artemisia pedatifida</i>	0	15
8		bud sagebrush	PICRO	<i>Picrothammus</i>	0	8
9		winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0	8
10		Shrub (>.5m)	2SHRUB		0	8

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

<u>Percent Production by Month</u>											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Perennial Grass/Mixed Shrub Plant Community

Historically, this plant community evolved under grazing and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock and will be exacerbated by prolonged drought conditions. This plant community is still dominated by cool-season midgrasses, while short warm-season grasses and miscellaneous forbs account for the balance of the understory. A variety of shrubs makes up the overstory.

Dominant grasses include bottlebrush squirreltail, and rhizomatous wheatgrasses. Grasses of secondary importance include Sandberg bluegrass, blue grama, and alkali sacaton. Forbs commonly found in this plant community include smooth woodyaster, stemless mock goldenweed, Hood's phlox, sulfur flower buckwheat, Cous biscuitroot, and scarlet globemallow. Shrubs such as Gardner saltbush, winterfat, birdfoot sagebrush and bud sagebrush account for 20% to 30% of the total production. Plains pricklypear can also occur.

When compared to the Historical Climax Plant Community, birdfoot sagebrush and smooth woody aster has increased. Indian ricegrass and bluebunch wheatgrass have decreased as the production of cool-season grasses has been reduced. Indian ricegrass may occur in only trace amounts under the sagebrush canopy or within the patches of pricklypear. Blue grama has increased. In addition, the amount of winterfat may or may not have changed depending on the season of use.

The total annual production (air-dry weight) of this state is about 70 pounds per acre, but it can range from about 25 lbs. /acre in unfavorable years to about 150 lbs. /acre in above average years.

This plant community is resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. The herbaceous component is mostly intact and plant vigor and replacement capabilities are sufficient. Water flow patterns and litter movement may be occurring but only on steeper slopes. Incidence of pedestalling is minimal. Soils are mostly stable and the surface shows minimum soil loss. The watershed is functioning and the biotic community is intact.

Transitional pathways leading to other plant communities are as follows:

- Prescribed grazing or possibly long-term prescribed grazing will convert this plant community to the HCPC. The probability of this occurring is high especially if rotational grazing along with short

deferred grazing is implemented as part of the prescribed method of use.

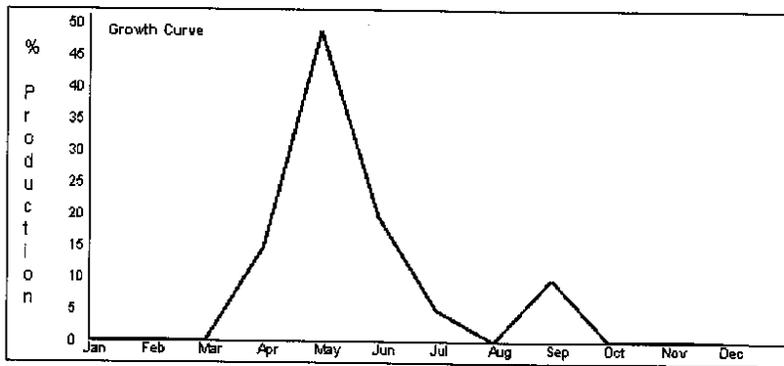
- Frequent and severe grazing over the long-term will convert this plant community to the Birdfoot Sagebrush/Woodyaster vegetative state.

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Birdfoot Sagebrush Plant Community

This vegetation state currently is found under heavy, season-long grazing by livestock in the absence of fire. Birdfoot sagebrush is a significant component of this plant community. Other plants, which may be of importance, include Gardner’s saltbush, and bud sagebrush. Cool-season grasses have been reduced. Bare ground, warm season grasses, and annual plants are also prominent.

The dominant grasses are blue grama and Sandberg bluegrass. Cool-season grasses have been eliminated or significantly reduced. Weedy annual species such as cheatgrass and Russian thistle may occur if a seed source is available. Cactus often increases.

The interspaces between plants have expanded significantly leaving the amount of bare ground more prevalent. As a result, the herbaceous production has been significantly reduced. When compared with the Perennial Grass/Mixed Shrub Plant Community the total annual production however, does not differ significantly as the shrub production off sets the decline in the herbaceous production. The

shift in production will affect the type and availability of forage.

The total annual production (air-dry weight) of this state is about 50 pounds per acre, but it can range from about 15 lbs. /acre in unfavorable years to about 150 lbs. /acre in above average years.

This plant community is resistant to change. These areas are actually more resistant to fire as less fine fuels are available and the bare ground between the shrubs has increased. Continued frequent and severe grazing or the removal of grazing does not seem to affect the composition or structure of the plant community. Plant diversity is moderate to poor. The plant vigor is diminished and replacement capabilities are limited due to the reduced number of cool-season grasses. Plant litter is noticeably less when compared to the HCPC.

Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestalling are obvious. Infiltration is reduced and runoff has increased. Rill channels may be noticeable in the interspaces and gullies may be establishing where rills have concentrated down slope.

Transitional pathways leading to other plant communities are as follows:

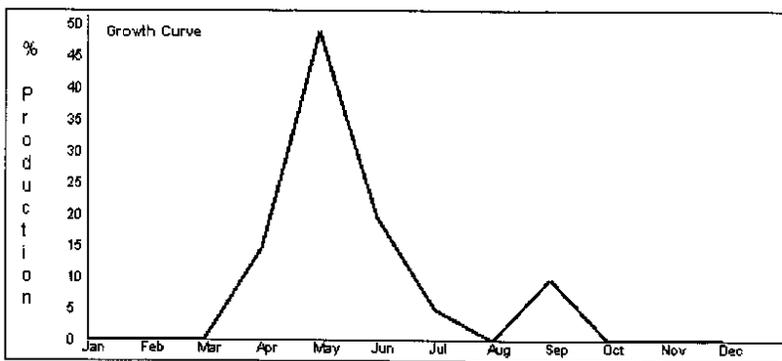
- Brush management (fire) and prescribed grazing will return this state to near Historic Climax Plant Community. Seeding native perennials may be necessary to hasten establishment of these species.

Plant Growth Curve:

Growth Curve Number: WY0501
Growth Curve Name: 5-9BH Upland sites
Growth Curve Description:

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	15	50	20	5	0	10	0	0	0



Ecological Site Interpretations

Animal Community:

Animal Community – Wildlife Interpretations

Historic Climax Plant Community: Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Due to the sparseness of the vegetation, this community does not provide escape and thermal cover for large ungulates or nesting habitat for sage grouse.

Perennial Grass/Mixed Shrub: Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush dominated states, this plant community may provide brood rearing/foraging areas for sage grouse, as well as lek sites. Due to the sparseness of the vegetation, this community does not provide escape and thermal cover for large ungulates or nesting habitat for sage grouse.

Birdfoot Sagebrush: This plant community can provide winter foraging for mule deer and antelope. Due to the sparseness of the vegetation, this community does not provide escape and thermal cover for large ungulates or for nesting habitat for sage grouse.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*

(lb. /ac) (AUM/ac)

Historic Climax Plant Community 85-250 .07

Perennial Grass/Mixed Shrub 25-150 .05

Birdfoot Sagebrush 15-150 .01

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Plant Preference by Animal Kind:

Animal Kind: ALL Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
threeawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threawn, red threawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush, paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush, green rabbitbrush, low rabbitbrush, Douglas rabbitbrush	<u><i>Chrysothamnus viscidiflorus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
pale bastard toadflax	<u><i>Comandra umbellata ssp. pallida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u><i>Deschampsia caespitosa(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
larkspur	<u><i>Delphinium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland saltgrass	<u><i>Distichlis spicata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Canada wildrye	<u><i>Elymus canadensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
squirreltail, bottlebrush	<u><i>Elymus elymoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass	<u><i>Elymus lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass, thickspike	<u><i>Elymus lanceolatus ssp. lanceolatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
slender wheatgrass	<u><i>Elymus trachycaulis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
horsetail	<u><i>Equisetum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
fleabane	<u><i>Erigeron</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
buckwheat	<u><i>Eriogonum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
rubber rabbitbrush	<u><i>Ericameria nauseosa</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
aster	<u><i>Eucephalus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
spiny hopsage	<u><i>Gravia spinosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

needle and thread, needleandthread	<u><i>Hesperostipa comata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
iris	<u><i>Iris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Baltic rush	<u><i>Juncus balticus(syn)</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Rocky Mountain juniper	<u><i>Juniperus scopulorum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
prairie Junegrass	<u><i>Koeleria macrantha</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
winterfat	<u><i>Krascheninnikovia lanata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
basin wildrye	<u><i>Leymus cinereus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
desertparsley, biscuitroot	<u><i>Lomatium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
tufted evening- primrose	<u><i>Oenothera caespitosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
nailwort	<u><i>Paronychia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
western wheatgrass	<u><i>Pascopyrum smithii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beardtongue, penstemon	<u><i>Penstemon</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
phlox	<u><i>Phlox</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bud sagebrush, bud sagewort	<u><i>Picrothamnus desertorum</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: all Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Sandberg bluegrass	<u><i>Poa junifolia(syn)</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: ALL Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
cottonwood	<u><i>Populus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	<u><i>Poa secunda</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
bluebunch wheatgrass	<u><i>Pseudoroegneria spicata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Nuttall's alkaligrass	<u><i>Puccinellia nuttalliana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
skunkbush sumac	<u><i>Rhus trilobata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u><i>Salix</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
stonecrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: All Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: all Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: ALL Antelope

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
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princesplume	<u>Stanleya</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve daisy	<u>Tetranneuris acaulis var. acaulis</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u>Triglochin</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u>Tragopogon porrifolius</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u>Turgenia</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u>Xylorhiza</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u>Yucca</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u>Achnatherum hymenoides</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agosaris, mountain dandelion, dandelion	<u>Agoseris</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u>Allium textile</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u>Antennaria</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u>Artemisia cana</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threeawn	<u>Aristida</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u>Artemisia nova</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
birdfoot sagebrush	<u>Artemisia pedatifida</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red threeawn	<u>Aristida purpurea var. longiseta</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u>Artemisia tridentata</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u>Astragalus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u>Atriplex canescens</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u>Atriplex confertifolia</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u>Atriplex gardneri</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u>Bouteloua gracilis</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u>Carex aquatilis</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
golden sedge	<u>Carex aurea</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threadleaf sedge	<u>Carex filifolia</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u>Carex interior</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
prairie sandreed	<u>Calamovilfa longifolia</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Nebraska sedge	<u>Carex nebrascensis</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
sedge	<u>Carex</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u>Carex rostrata</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pond water-starwort	<u>Callitriche stagnalis</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush, paintbrush	<u>Castilleja</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush, green rabbitbrush, low rabbitbrush, Douglas rabbitbrush	<u>Chrysothamnus viscidiflorus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pale bastard toadflax	<u>Comandra umbellata ssp. pallida</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u>Deschampsia caespitosa(syn)</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
larkspur	<u>Delphinium</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland saltgrass	<u>Distichlis spicata</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Canada wildrye	<u>Elymus canadensis</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
squirreltail, bottlebrush squirreltail	<u>Elymus elymoides</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
streambank wheatgrass	<u>Elymus lanceolatus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
wheatgrass, thickspike wheatgrass	<u>Elymus lanceolatus ssp. lanceolatus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

slender wheatgrass	<u><i>Elymus trachycaulus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
horsetail	<u><i>Equisetum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
fleabane	<u><i>Erigeron</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
buckwheat	<u><i>Eriogonum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
rubber rabbitbrush	<u><i>Ericameria nauseosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
aster	<u><i>Eucephalus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
spiny hopsage	<u><i>Gravia spinosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
needle and thread, needleandthread	<u><i>Hesperostipa comata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
iris	<u><i>Iris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Baltic rush	<u><i>Juncus balticus(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Rocky Mountain juniper	<u><i>Juniperus scopulorum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
prairie Junegrass	<u><i>Koeleria macrantha</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
winterfat	<u><i>Krascheninnikovia lanata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
basin wildrye	<u><i>Levmus cinereus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
desertparsley, biscuitroot	<u><i>Lomatium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
tufted evening- primrose	<u><i>Oenothera caespitosa</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
ailwort	<u><i>Paronychia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
western wheatgrass	<u><i>Pascopyrum smithii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beardtongue, penstemon	<u><i>Penstemon</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
phlox	<u><i>Phlox</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
bud sagebrush, bud sagewort	<u><i>Picrothammus desertorum</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Animal Kind: all Cattle																						
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>								
Sandberg bluegrass	<u><i>Poa juncifolia(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D								
Animal Kind: ALL Cattle																						
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>								
cottonwood	<u><i>Populus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P								
Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	<u><i>Poa secunda</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D								
bluebunch wheatgrass	<u><i>Pseudoroegneria spicata</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P								
Nuttall's alkaligrass	<u><i>Puccinellia nuttalliana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P								
skunkbush sumac	<u><i>Rhus trilobata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D								
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D								
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U								
willow	<u><i>Salix</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P								
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D								
stonecrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U								
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U								
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U								
Animal Kind: All Cattle																						
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>								
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P								
Animal Kind: ALL Cattle																						
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>								

scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: all Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Cattle

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve daisy	<u><i>Tetranneuris acaulis var. acaulis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u><i>Yucca</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Deer

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
threecawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red threeawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<u><i>Carex interior</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
prairie sandreed	<u><i>Calamovilfa longifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Nebraska sedge	<u><i>Carex nebrascensis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sedge	<u><i>Carex</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<u><i>Carex rostrata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
pond water-starwort	<u><i>Callitriche stagnalis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush, paintbrush	<u><i>Castilleja</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
yellow rabbitbrush, green rabbitbrush, low rabbitbrush, Douglas rabbitbrush	<u><i>Chrysothamnus viscidiflorus</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
pale bastard toadflax	<u><i>Comandra umbellata ssp. pallida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
tufted hairgrass	<u><i>Deschampsia caespitosa(syn)</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
larkspur	<u><i>Delphinium</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

silver buffaloberry	<i>Shepherdia argentea</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<i>Sisyrinchium</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: All Deer																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
alkali sacaton	<i>Sporobolus airoides</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: ALL Deer																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
scarlet globemallow	<i>Sphaeralcea coccinea</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<i>Sporobolus cryptandrus</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: all Deer																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
alkali cordgrass	<i>Spartina gracilis</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Animal Kind: ALL Deer																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
princesplume	<i>Stanleya</i>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve																
daisy	<i>Tetaneuris acaulis var. acaulis</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<i>Tripsacchidion</i>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<i>Tragopogon porrifolius</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<i>Turgenia</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<i>Xylorhiza</i>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<i>Yucca</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Animal Kind: ALL Horses																
<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>E</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>		
Indian ricegrass	<i>Achnatherum hymenoides</i>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
agosaris, mountain																
dandelion, dandelion	<i>Agoseris</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<i>Allium textile</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<i>Antennaria</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<i>Artemisia cana</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
threeawn	<i>Aristida</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<i>Artemisia nova</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
birdfoot sagebrush	<i>Artemisia pedatifida</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red																
threeawn	<i>Aristida purpurea var. longiseta</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<i>Artemisia tridentata</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
milkvetch	<i>Astragalus</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<i>Atriplex canescens</i>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<i>Atriplex confertifolia</i>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<i>Atriplex gardneri</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
blue grama	<i>Bouteloua gracilis</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<i>Carex aquatilis</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
golden sedge	<i>Carex aurea</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
threadleaf sedge	<i>Carex filifolia</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
inland sedge	<i>Carex interior</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
prairie sandreed	<i>Calamovilfa longifolia</i>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Nebraska sedge	<i>Carex nebrascensis</i>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
sedge	<i>Carex</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
beaked sedge	<i>Carex rostrata</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
pond water-starwort	<i>Callitriche stagnalis</i>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Indian paintbrush,																

Nuttall's alkaligrass	<u><i>Puccinellia nuttalliana</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P	P	P
skunkbush sumac	<u><i>Rhus trilobata</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Woods' rose	<u><i>Rosa woodsii var. woodsii</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
dock	<u><i>Rumex</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u><i>Salix</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D	D	D
greasewood	<u><i>Sarcobatus vermiculatus</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
stoncrop	<u><i>Sedum</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u><i>Shepherdia argentea</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u><i>Sisyrinchium</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: All Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali sacaton	<u><i>Sporobolus airoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P

Animal Kind: ALL Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
scarlet globemallow	<u><i>Sphaeralcea coccinea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u><i>Sporobolus cryptandrus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: all Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali cordgrass	<u><i>Spartina gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Horses

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
princesplume	<u><i>Stanleya</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve daisy	<u><i>Tetraneuris acaulis var. acaulis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u><i>Triglochin</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u><i>Tragopogon porrifolius</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u><i>Turgenia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
woodyaster	<u><i>Xylorhiza</i></u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u><i>Yucca</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: ALL Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>I</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
Indian ricegrass	<u><i>Achnatherum hymenoides</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
agoseris, mountain dandelion, dandelion	<u><i>Agoseris</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
textile onion	<u><i>Allium textile</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
pussytoes	<u><i>Antennaria</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver sagebrush	<u><i>Artemisia cana</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threeawn	<u><i>Aristida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
black sagebrush	<u><i>Artemisia nova</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
birdfoot sagebrush	<u><i>Artemisia pedatifida</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Fendler threeawn, red threeawn	<u><i>Aristida purpurea var. longiseta</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
big sagebrush	<u><i>Artemisia tridentata</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
milkvetch	<u><i>Astragalus</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
fourwing saltbush	<u><i>Atriplex canescens</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
shadscale saltbush	<u><i>Atriplex confertifolia</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
Gardner's saltbush	<u><i>Atriplex gardneri</i></u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
blue grama	<u><i>Bouteloua gracilis</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
water sedge	<u><i>Carex aquatilis</i></u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
golden sedge	<u><i>Carex aurea</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
threadleaf sedge	<u><i>Carex filifolia</i></u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

cottonwood	<u>Populus</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Sandberg bluegrass, big bluegrass, Canby bluegrass, alkali bluegrass	<u>Poa secunda</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
bluebunch wheatgrass	<u>Pseudoroegneria spicata</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
Nuttall's alkaligrass	<u>Puccinellia nuttalliana</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
skunkbush sumac	<u>Rhus trilobata</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
Woods' rose	<u>Rosa woodsii var. woodsii</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
dock	<u>Rumex</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
willow	<u>Salix</u>	Entire plant	P	P	P	P	P	P	P	P	P	P	P	P
greasewood	<u>Sarcobatus vermiculatus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
stonecrop	<u>Sedum</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
silver buffaloberry	<u>Shepherdia argentea</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
blue-eyed grass	<u>Sisyrinchium</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: All Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali sacaton	<u>Sporobolus airoides</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: ALL Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
scarlet globemallow	<u>Sphaeralcea coccinea</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
sand dropseed	<u>Sporobolus cryptandrus</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Animal Kind: all Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
alkali cordgrass	<u>Spartina gracilis</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U

Animal Kind: ALL Sheep

<u>Common Name</u>	<u>Scientific Name</u>	<u>Plant Part</u>	<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>Q</u>	<u>N</u>	<u>D</u>
princesplume	<u>Stanleya</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
stemless four-nerve daisy	<u>Tetaneuris acaulis var. acaulis</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
arrowgrass	<u>Triglochin</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
salsify	<u>Trigonopogon porrifolius</u>	Entire plant	U	U	U	U	U	U	U	U	U	U	U	U
false carrot	<u>Turgenia</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D
woodyaster	<u>Xylophiza</u>	Entire plant	T	T	T	T	T	T	T	T	T	T	T	T
yucca	<u>Yucca</u>	Entire plant	D	D	D	D	D	D	D	D	D	D	D	D

Legend: P = Preferred D = Desirable U = Undesirable N = Not consumed E = Emergency T = Toxic X = Used, but degree of utilization unknown

Hydrology Functions:

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration ranges from slow to moderate. Runoff potential for this site varies from moderate to very high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills will be continuous on slopes > 9% and gullies may be present on steeper slopes. Water flow paths will be obvious, regular and continuous with debris dams occurring only on lesser slopes. Erosional pedestals present with terraces present at debris dams in association with bunchgrasses

such as bluebunch wheatgrass. Plant litter movement is expected on steeper slopes but typically falls in place and signs of movement are not common on slopes of < 9%. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% of the soil surface.

Recreational Uses:

This site provides hunting opportunities for upland game species. The wide varieties of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products:

No appreciable wood products are present on the site.

Other Products:

None noted.

Other Information:

Supporting Information

Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Shallow Clayey (SwCy) 5-9" Big Horn Basin Precipitation Zone	R032XY158WY	
Very Shallow (VS) 5-9" Big Horn Basin Precipitation Zone	R032XY176WY	

Similar Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Shale (Sh) 10-14" East Precipitation Zone	R032XY354WY	Shale 10-14" Foothills and Basins East P.Z., 032XY354WY, has higher production.

State Correlation:

This site has been correlated with the following states:
WY

Inventory Data References:

Information presented here has been derived from NRCS inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417	19	1965-1986	WY	Park & others

<http://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R032XY154WY&rptLevel=...> 9/18/2012

Type Locality:Relationship to Other Established Classifications:Other References:Site Description Approval:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Ray Gullion	8/12/2005	E. Bainter	5/21/2008

Reference Sheet

Author(s)/participant(s): Ray Gullion

Contact for lead author: ray.gullion@wy.usda.gov

Date: 5/2/2008 **MLRA:** 032X **Ecological Site:** Shale (Sh) 5-9" Big Horn Basin
Precipitation Zone R032XY154WY This *must* be verified based on soils and climate (see
Ecological Site Description). Current plant community cannot be used to identify the ecological site.

Composition (indicators 10 and 12) based on: XAnnual Production, Foliar Cover,
Biomass

Indicators. For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above- and below-average years for **each** community and natural disturbance regimes within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

-
1. **Number and extent of rills:** Rills will be continuous.

 2. **Presence of water flow patterns:** Water flow paths will be obvious, regular and continuous with debris dams occurring only on lesser slopes.

 3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals present with terracettes present at debris dams.

 4. **Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground):** Bare ground is 75 to 85%.

 5. **Number of gullies and erosion associated with gullies:** Active gullies may be present on

<http://esis.sc.gov.usda.gov/ESDReport/fsReportPrt.aspx?id=R032XY154WY&rptLevel=...> 9/18/2012

steeper slopes.

-
- 6. Extent of wind scoured, blowouts and/or depositional areas:** None.
-
- 7. Amount of litter movement (describe size and distance expected to travel):** Plant litter movement is expected.
-
- 8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 15% or greater of soil surface. Stability class anticipated to be 3 or greater.
-
- 9. Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness):** Use soil series description for depth and color of A-horizon.
-
- 10. Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse plant canopy, slow infiltration rates, and the high amount of bare ground contribute to a naturally high runoff rate even in HCPC.
-
- 11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer would be expected but soil surface is typically crusted and hard to very hard when dry.
-
- 12. Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:**
 Dominant: Mid stature grasses >> shrubs > forbs > short stature grasses/grasslikes
 Sub-dominant:
 Other:
 Additional:
-
- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Some plant mortality and decadence (10 to 15%) is expected on this site.
-
- 14. Average percent litter cover (5 - 10 %) and depth (0.1 - 0.2 inches):** Average litter cover is 5-10% with depths of 0.1 to 0.2 inches. Litter cover is in contact with soil surface with little evidence of biological activity.
-
- 15. Expected annual production (this is TOTAL above-ground production, not just forage production):** 100 lbs/acre
-
- 16. Potential invasive (including noxious) species (native and non-native). List Species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only**

one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicator, we are describing what in NOT expected in the reference state for the ecological site: Birdfoot sagebrush, Woodyaster, Short warm-season grasses, Annuals, Exotics, and Species found on Noxious Weed List.

17. Perennial plant reproductive capability: Limited ability to reproduce.

Reference Sheet Approval:

Approval
E. Bainter

Date
5/2/2008

Photo 1. General View Of Cover Transect (2009)

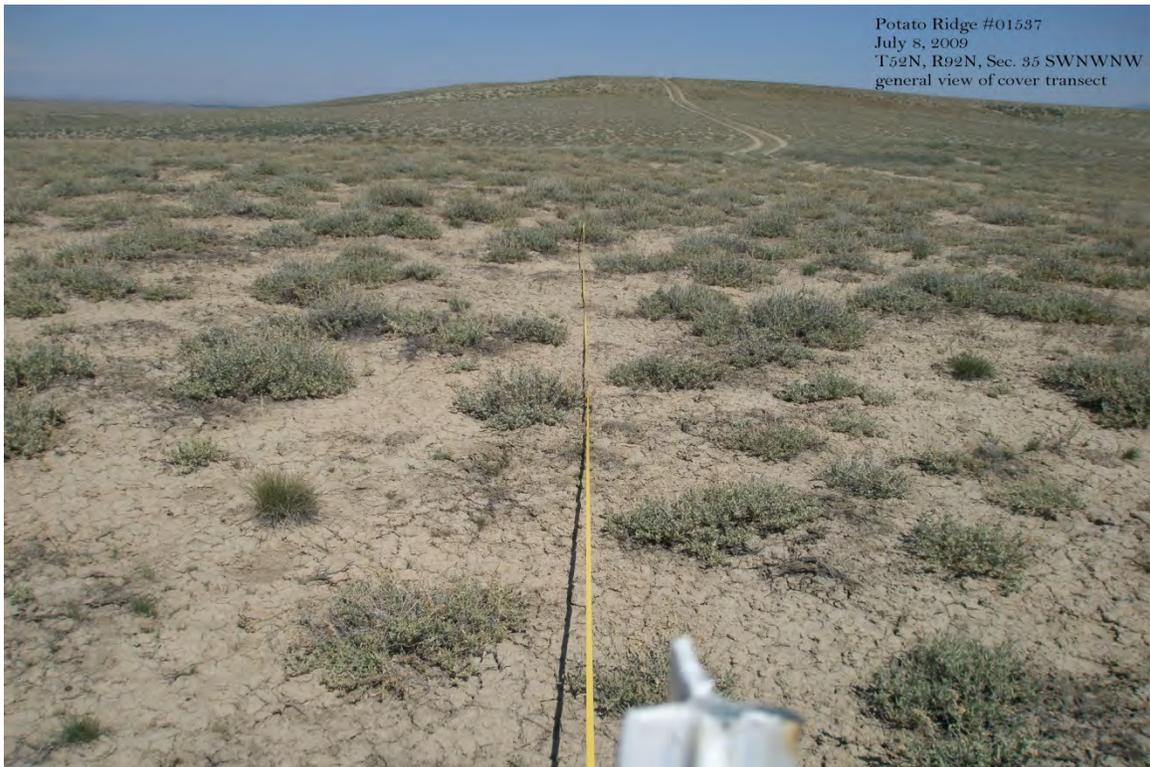


Photo 2. Transect @ 25' Mark



Exhibit 3. Soils Worksheet for Cover Transect Site (Sec. 35)

6/18/12 Cover Transect

Soil type <u>Potent Ridge Alluvium</u>	Date <u>7/2/12</u>	Stop No. <u>#1</u>
Classification <u>T. Tormentum (shallow)</u>	Area	
Location <u>44.43954 107.8808</u>	<u>Map Unit 374</u>	
N. veg. (or crop) <u>Solms Upland S-9</u>	Climate <u>Chippewa - Pecosys - 20</u>	
Parent material <u>shale</u>	Stoniness	
Physiography		
Relief	Drainage	Salt or alkali
Elevation	Gr. water	Stoniness
Slope	Moisture	
Aspect	Root distrib.	% Clay*
Erosion	% Coarse fragments*	% Coarser than V.F.S.*
Permeability		
Additional notes <u>Solms. Upland ecos. site based on soil depth > 10"</u>		

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction pH	Boundary
		Dry	Moist			Dry	Moist	Wet		
A1	0-2	2.5YR 6/2	2.5YR 4/4	S.c.l.					6.4	
A2	2-6	2.5YR 5/2	2.5YR 4/4	S.c.l.		soft	5/4		6.4	Soft Sp concentration
A3	6-18	—	—	S.c.l.	Massive	soft	5/4		6.2	Soft Sp concentration
R	18-20	Soft fractured shale			M					
		Arrow - chert cogen below 20" chert roots below 18"								

Soil S ₁ to S ₅		lit/	
#	#	#	#
1	-	6	-
2	-	7	-
3	-	8	-
4	-	9	-
5	-	10	-

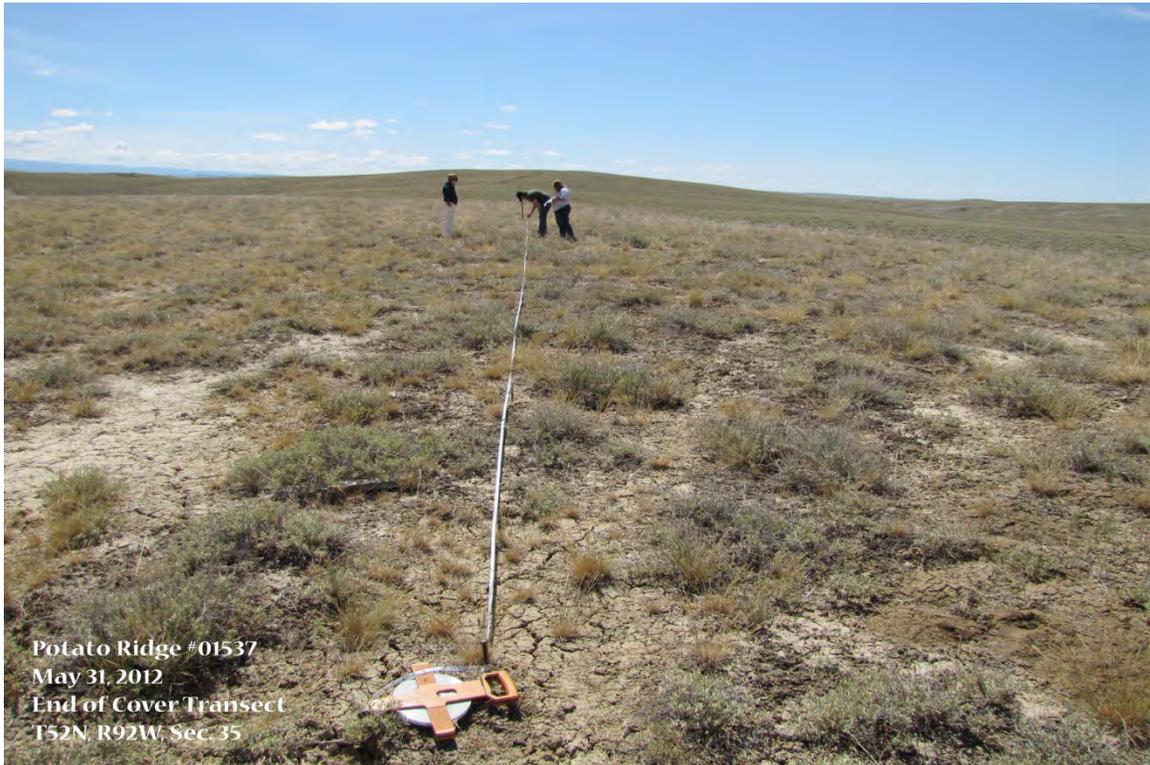
Photo 3. General View of Cover Transect



Photo 4. Transect @ 25' Mark



Photo 5. End of Transect



Potato Ridge #01537
May 31, 2012
End of Cover Transect
T52N, R92W, Sec. 35

Exhibit 5. Soils Worksheet for Sample Point Transect #1

Soil type	Potato Ridge Allotment		Date	6/18/12	Sample Point	Stop No.	202/1
Classification	T. Tormentor (Shallow)		Area				
Location	44.46769 167.59220		Map Unit	374			
N. veg. (or crop)	Saline Upland 5-9		Climate	Chaparral - Pecosay - R0			
Parent material	shale						
Physiography							
Relief	Drainage		Salt or alkali				
Elevation	Gr. water		Stoniness				
Slope	Moisture						
Aspect	Root distrib.		% Clay*				
Erosion	% Coarse fragments*		% Coarser than V.F.S.*				
Permeability							
Additional notes							
Saline Upland							
Saline Upland Eco site based on depth > 10"							
Bad Pit - Pecosay Silt							

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction	Boundary
		Dry	Moist			Dry	Moist	Wet		
A	0-1	2.5YR 6/2	2.5YR 4/6	Silcl	platy				5.0	
AC _{oxy}	1-6	2.5YR 6/2	2.5YR 4/3	Silcl	2mbr	Salt Gyp inclusions			5.0	
C ₁	6-16		2.5YR 7/2	Silcl					5.0	
C ₂	20"								5.0	
	28"	2.5YR	2.5YR 2.5/2	Clay					5.0	
C ₃	35"		5YR 7/2	Clay					5.0	

Soil	Stability	Soil	Stability
#	#	#	#
1	6		
2	7		
3	8		
4	9		
5	10		

Photo 6. General View of Sample Point Transect #1

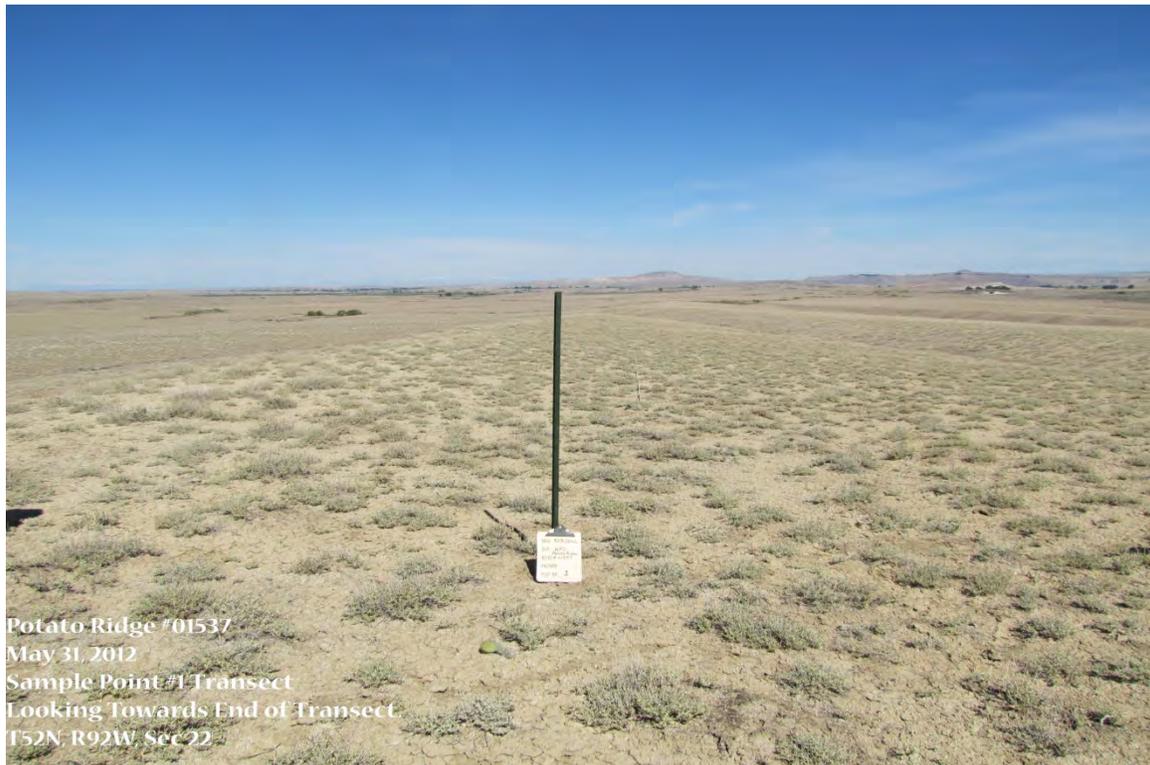


Photo 7. End of Sample Point Transect #1

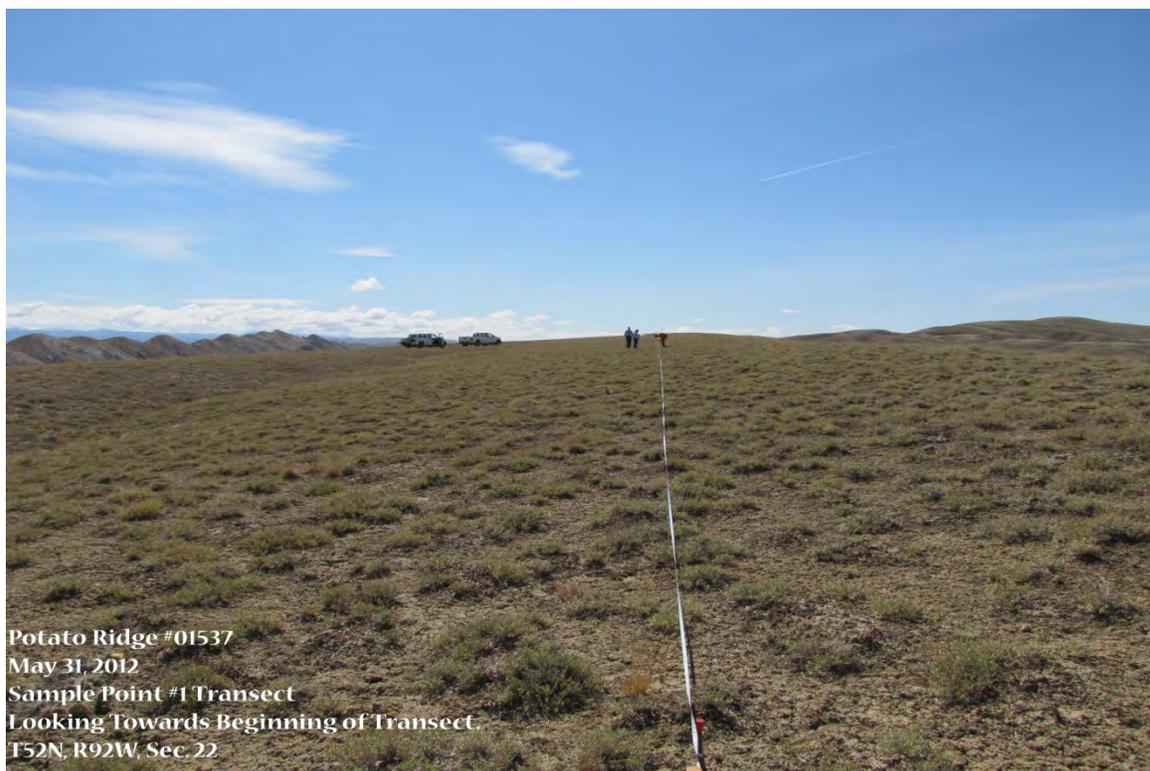


Photo 8. General View of Sample Point Transect #2



Photo 9. End of Sample Point Transect #2



Photo 10. View of Two Doe Reservoir

