

United States Department of the Interior Bureau of Land Management

**Finding of No Significant Impact
Environmental Assessment
DOI-BLM-UT-G010-2009-0218**

June 24, 2013

**Term Grazing Permit Renewal
Allotments: Argyle Ridge, Lears Canyon & Water Canyon #1**

Location: Argyle Ridge: Township 11 & 12 South, Range 12 & 13 East
Lears Canyon: Township 10 & 11 South, Range 12 & 13 East
Water Canyon #1: Township 11 & 12 South, Range 11 & 12 East
Duchesne County, Utah

Applicant/Address: Fasselin, George; Scott, Gene; & Jensen, Kaylene; Wellington, Utah
Oman, Jackie; Price, Utah Staker, James Allen; Price, Utah
Terry, Dale & Vilate; Price, Utah
Day Family Living Trust; Coalville, Utah
JTJJ Enterprises, LTD; Price, Utah

Vernal Field Office
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FINDING OF NO SIGNIFICANT IMPACT

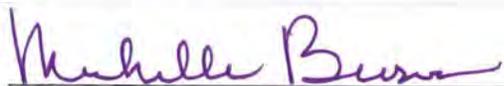
Environmental Assessment

DOI-BLM-G010-2009-0218

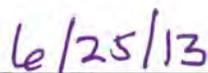
Term Grazing Permit Renewal

Allotments: Argyle Ridge, Lears Canyon & Water Canyon #1

Based on the analysis of potential environmental impacts contained in the (referenced or attached) environmental assessment DOI-BLM-G010-2009-0218, and considering the significance criteria in 40 CFR 1508.27, I have determined that Proposed Alternative, Alternative B will not have a significant effect on the human environment. An environmental impact statement is therefore not required.



Michelle L. Brown
Assistant Field Manager



Date

**United States Department of the Interior
Bureau of Land Management**

**Decision Record
Environmental Assessment
DOI-BLM-UT-G010-2009-0218**

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PROPOSED DECISION RECORD

Environmental Assessment

DOI-BLM-G010-2009-0218

Term Grazing Permit Renewal

Allotments: Argyle Ridge, Lears Canyon, and Water Canyon #1

Authorities

This action is in accordance with 43 CFR 4160.

Proposed Decision

It is my Proposed Decision to cancel the existing permits and reissue new term (ten year) grazing permits for the Argyle Ridge, Lears Canyon and Water Canyon #1 Allotments as described in the Proposed Alternative, Alternative B, in Environmental Assessment (EA) DOI-BLM-G010-2009-0218. The new grazing permit will incorporate all Terms and Conditions identified common to all alternatives and Terms and Conditions specific to Proposed Alternative, Alternative B, of the EA, including new season of use dates.

Specific to the Proposed Decision the new permits would be issued with the following modifications:

Alternative B: Season of Use Information										
Allotment Name	Permittee	Kind	Existing Season of Use				Proposed Season of Use			
			Animal #s	On Date	Off Date	AUMs	Animal #s	On Date	Off Date	AUMs
Argyle Ridge	Fasselin / Jensen	Cattle	162	06/15	11/01	149	150	6/1	10/31	149
Argyle Ridge	Oman	Cattle	14	06/01	10/15	34	14	6/1	10/31	34
Argyle Ridge	Staker	Cattle	15	06/01	10/15	33	14	6/1	10/31	33
Argyle Ridge	Terry	Cattle	120	06/15	11/15	122	121	6/1	10/31	122
Lears Canyon	Fasselin / Jensen	Cattle	264	05/15	06/15	278	64	6/1	10/31	278
Lears Canyon	Day Family Living Trust	Horse	3	03/01	02/28	30	6	6/1	10/31	30
Water Canyon #1	JTJJ Enterprises, LTD	Cattle	98	06/15	10/10	153	98	6/15	10/10	153

* Livestock AUMs would remain the same

Utilization Modifications

- Manage the allotment for the following utilization levels of key species to meet the desired objectives for vegetation composition.
- Combined livestock and wildlife use of key upland species would not exceed 50% on grasses and forbs.

- Provide for bank protection and sediment entrapment, riparian areas would be managed for the following utilization levels:
- Key herbaceous riparian vegetation, where stream bank stability is dependent upon it, would have a minimum stubble height of 4 inches on the stream bank along the green line at the end of the growing season.
- Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals.

Rationale

The Proposed Decision to cancel the existing permits and reissue new, modified term (ten year) grazing permits on the Argyle Ridge, Lears Canyon and Water Canyon #1 Allotments has been made in consideration of the environmental impacts of the proposed action. It has been determined that all three allotments are meeting *Utah BLM Standards for Rangeland Health*. The selected alternative, Alternative B, was chosen based on the analysis of the permit(s) terms and conditions, to include modified season of use. These features of Alternative B would contribute to the continued success in meeting land health standards in the area.

Public involvement consisted of posting the proposal on the Utah BLM Environmental Notification Bulletin Board (ENBB) on March 22, 2013. No comments were received from either the public or interested publics.

Mitigation Measures:

ACEC

If an ACEC management activity plan, and the accompanying site-specific NEPA is completed for the Lears Canyon ACEC, it could be implemented during the new ten-year Term Grazing Permit and the area could be fenced. Exclosure fencing would likely require an adjustment in the estimated forage available to livestock, with a corresponding AUM adjustment made for the permit. This analysis and change should be evaluated in the ACEC NEPA prior to implementation.

Invasive Plants/Noxious Weeds

Follow-up evaluation for houndstongue, its relative abundance and its effects on the plant communities in these specific soil types, elevations and geographical areas should be further explored to evaluate the species influence under a wide range of conditions and multiple resource uses and events. USDA and BLM biological and noxious weed technology personnel should continue to be alerted to this area as a potential area for houndstongue research.

Establish at least one long-term paced transect in each allotment (Argyle Ridge, Lears Canyon and Water Canyon #1) designed to specifically monitor the relative abundance of houndstongue in a median, area-representative, non-fire, livestock-utilized plant community to assist in Rangeland Health evaluation. These can be co-located with current Rangeland Health sites.

Continue awareness and updates to the noxious weed research community on houndstongue status in the greater Argyle Ridge area.

Treat new infestations in any areas of the allotments that are not currently infested with houndstongue, aggressively and rapidly, under the VFO upland Integrated Weed Treatment Program.

Livestock Grazing/Rangeland Health

Should Rangeland Health monitoring indicate declining conditions in the Argyle Ridge Allotment, adjustment to all four Term Grazing Permits should be addressed in a follow-up NEPA document that would consider a turn out date later in the growing season.

The new permits would be issued with Standard Terms and Conditions, as well as the following additional Terms and Conditions, as outlined in the Proposed Action:

- Manage the allotment for the following utilization levels of key species to meet the desired objectives for vegetation composition.
- Combined livestock and wildlife use of key upland species would not exceed 50% on grasses and forbs.
- Provide for bank protection and sediment entrapment, riparian areas would be managed for the following utilization levels:
 - Key herbaceous riparian vegetation, where stream bank stability is dependent upon it, would have a minimum stubble height of 4 inches on the stream bank along the green line at the end of the growing season.
 - Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals.

Threatened, Endangered, Proposed or Candidate

Mexican Spotted Owl

The following conservation measures are meant to minimize and/or avoid negative impacts to MSO's:

- Utilization levels proposed under the proposed alternative would ensure that enough residual cover would remain on the allotments to support sufficient prey abundance for the MSO.
- Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached, or due to unusual climatic conditions, fire, flood, or other act of nature. The BLM would assess resource conditions through field inspections and determine, in consultation with the permittee, whether management changes (e.g., changes in livestock numbers, adjustment of move dates, or other changes of use within the parameters identified under this alternative) may be implemented. If maximum utilization is reached on key species/areas in the allotment before a scheduled move, the use of salt, herding, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be moved from the use area or allotment. This would improve the condition of upland, riparian, and MSO habitat by assuring that the utilization levels are not exceeded. This would also reduce any damage to habitat by restricting use during critical drought periods.
- Utilization of key species would not exceed 50% on herbaceous species and 40% on shrub species based on current year's growth (by weight) during the grazing season. This would allow the growth/regrowth of vegetative species to achieve their potential growth

form. These utilization levels would facilitate maintaining or improving the condition of upland and riparian areas, including habitat for MSO prey species.

- The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.
- The overall management objectives for the allotments prepared for each permittee and their associated allotments would be late seral (good) ecological condition or better for all ecological sites (with a mix of age classes to provide a vegetative mosaic), and static to upward trend. While this would be the primary objective, there may be circumstances (such as threatened or endangered species requirements) where areas would be managed for an earlier seral stage. This could benefit the MSO by maintaining and/or improving potentially suitable canyon habitat.
- All riparian areas would be managed for proper functioning condition with static to upward trend. The attainment of these objectives would be analyzed and evaluated within the limitations of the ecological site's potential. The attainment of this objective would benefit the MSO by helping maintain the condition of habitat for prey species and improving the condition of potentially suitable habitat.

Migratory birds (including raptors)

The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.

Fish and Wildlife Excluding USFWS Designated Species

Big Game

The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.

Grazing Compliance and Monitoring

Monitoring studies will be conducted by BLM personnel as designated in the Vernal Field Office Annual Work Plan. Data gathered will be evaluated at the end of the grazing cycle (five years) to determine grazing system effectiveness in meeting allotment objectives. Long term quantitative monitoring studies have been established in each of the three allotments. This monitoring data will be regularly gathered and analyzed to determine if management objectives are being attained.

If future monitoring indicates non-conformance with the *Utah BLM Standards for Rangeland Health and the Fundamentals of Rangeland Health*, the permit may be modified and reissued with Terms and Conditions that would result in conformance.

The BLM would assess resource conditions through field inspections and determine, in consultation with the permittee, management changes (e.g., changes in livestock numbers, adjustment of move dates, or other changes of use within the parameters identified) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached, or due to unusual climatic conditions, fire, flood, or other act of nature. If maximum utilization is reached on key species/areas in the allotment before a scheduled move, the use of salt, herding, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be moved from the use area or allotment (after consultation with the permittee) as deemed necessary by the BLM.

Plan Conformance and Consistency:

The proposed action and alternatives have been reviewed and found to be in conformance with the following BLM Land Use Plan and the associated decision(s):

- The Vernal Field Office Record of Decision and Approved Resource Management Plan (2008), which identifies the allotment as being open for livestock grazing and falling within the authority of the 1934 Taylor Grazing Act, the 1976 Federal Land Policy and Management Act, and the Grazing Administration regulations under 43 CFR 4100.

Protest / Appeal Language:

Any applicant, permittee, lessee, or other interested public may protest this proposed decision (in accordance with 43 CFR 4160.2) in person or in writing within 15 days after receipt of this decision. The protest should specify the reason(s), clearly and concisely, why the decision is in error. Protests submitted in writing must be submitted in person or sent by U.S. Postal Service mail and be addressed to:

Vernal Field Office Manager
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, Utah 84078

In the absence of a protest, the proposed decision shall constitute my final decision without further notice unless otherwise provided in the proposed decision, in accordance with 43 CFR 4160.3 (a).

Any applicant, permittee, lessee, or other person whose interest is adversely affected by the final decision may file an appeal and petition for stay of the decision pending final determination on appeal for the purpose of a hearing before an Administrative Law Judge in accordance with 43 CFR 4160.3(c), 4160.4, 4.21, and 4.470. The appeal and petition for a stay must be filed in the office of the authorized officer within 30 days following receipt of this final decision, or within 30 days after the date the proposed decision becomes final. The appeal and petition for a stay must be submitted in writing (in person or via U.S. Postal Service mail only) and be addressed to:

Vernal Field Office Manager
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, Utah 84078

The appeal shall state the reasons, clearly and concisely, why the appellant thinks the final decision is in error.

Should you wish to file a motion for stay, in accordance with 43 CFR Section 4.21 (B) (1), the appellant shall show sufficient justification based on the following standards:

1. The relative harm to the parties if the stay is granted or denied;
2. The likelihood of the appellant's success on the merits;
3. The likelihood of immediate and irreparable harm if the stay is not granted;
4. Whether the public interest favors granting the stay.

The appellant requesting the stay bears the burden of proof to demonstrate that a stay should be granted.

Alternatives Considered

Alternative A - No Action: Continue Grazing As Permitted Under Existing Terms and Conditions

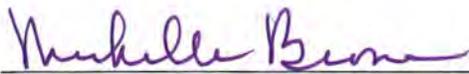
Under this alternative, livestock grazing would occur during the current seasons of use, at the permitted use levels (AUMs) and under the existing terms and conditions of the permit. This alternative was not chosen because it stunts early spring vegetative growth in Lears Canyon, and the turn-out and off-dates are not standardized between the four permittees on the Argyle Ridge Allotment.

Alternative B – Proposed Action: Cancel Existing Grazing Permit and Issue New Permit with Modifications

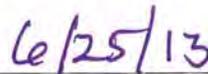
Under this alternative, Term Grazing permits would be cancelled and re-issued with season of use modifications, and additional Terms and Conditions to six permittees utilizing the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. This was the selected alternative.

Alternative C – No Grazing

Under this alternative, livestock grazing would not occur on the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments for a grazing cycle of ten years. This alternative was not chosen because it is inconsistent with the Taylor Grazing Act and the decisions and analysis in the Vernal Field Office Record of Decision and Approved Resource Management Plan (2008b) (pages 14-15).



Michelle L. Brown
Assistant Field Manager



Date

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1.0 PURPOSE & NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared to analyze the potential site-specific effects of livestock grazing on resources that may be affected on the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments prior to re-issuance of BLM Term Grazing Permits. Six different livestock operators utilize the three allotments as presented in Table 1.

Table 1: Existing Term Grazing Permit Summary

Allotment Name	Permittee	Permit Number	Livestock		Permitted Use AUMs	% on Public Land
			Kind	Season of Use		
Argyle Ridge	Fasselin / Jensen	4300242	Cattle	06/15 – 11/01	149	20
Arglye Ridge	Oman	4300303	Cattle	06/01 – 10/15	35	54
Argyle Ridge	Staker	4300257	Cattle	06/01 – 10/15	34	49
Argyle Ridge	Terry	4308073	Cattle	06/15 – 11/15	121	20
Lears Canyon	Fasselin / Jensen	4300242	Cattle	05/15 – 06/15	278	100
Lears Canyon	Day Family Living Trust	4300657	Horse	03/01 – 02/28	30	83
Water Canyon #1	JTJJ Enterprises, LTD	4300433	Cattle	06/15 – 10/10	153	40

The EA is an analysis of potential impacts that could result with the implementation of the Proposed Action, the No Action, or the No Grazing Alternatives. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). A Decision Record (DR), which includes a FONSI statement, is a document that briefly presents the reasons why implementation of the selected alternative will not result in “significant” environmental impacts (effects) beyond those already addressed in the Vernal Field Office Resource Management Plan and Record of Decision (RMP/ROD), (October 31, 2008). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS could be prepared for the project. If not, a Decision Record may be signed for the EA approving the alternative selected.

Currently, in accordance with BLM directives and the RMP, the Vernal Field Office (VFO) is reviewing and assessing livestock grazing permits for conformance with Utah BLM’s Standards for Rangeland Health that were set in 1997. The BLM is also responsible for ensuring that all management actions on public land conform to the appropriate Land Use Plans, are site specific, and balance the use of different resource values.

1.2 Background

Argyle Ridge (20,709 acres), Lears Canyon (10,703 acres), and Water Canyon #1 (4,268 acres) Allotments are located approximately 40 to 50 miles southwest of Myton, Utah, within Duchesne County, Utah. Small segments of the Argyle Ridge and Water Canyon #1 Allotments also occur in Carbon County. (Map 1: Allotment Area Overview). The current permits were issued in 2004 (Water Canyon #1) and in 2008 (Argyle Ridge and Lears Canyon) and will expire in 2014 and 2018, respectively.

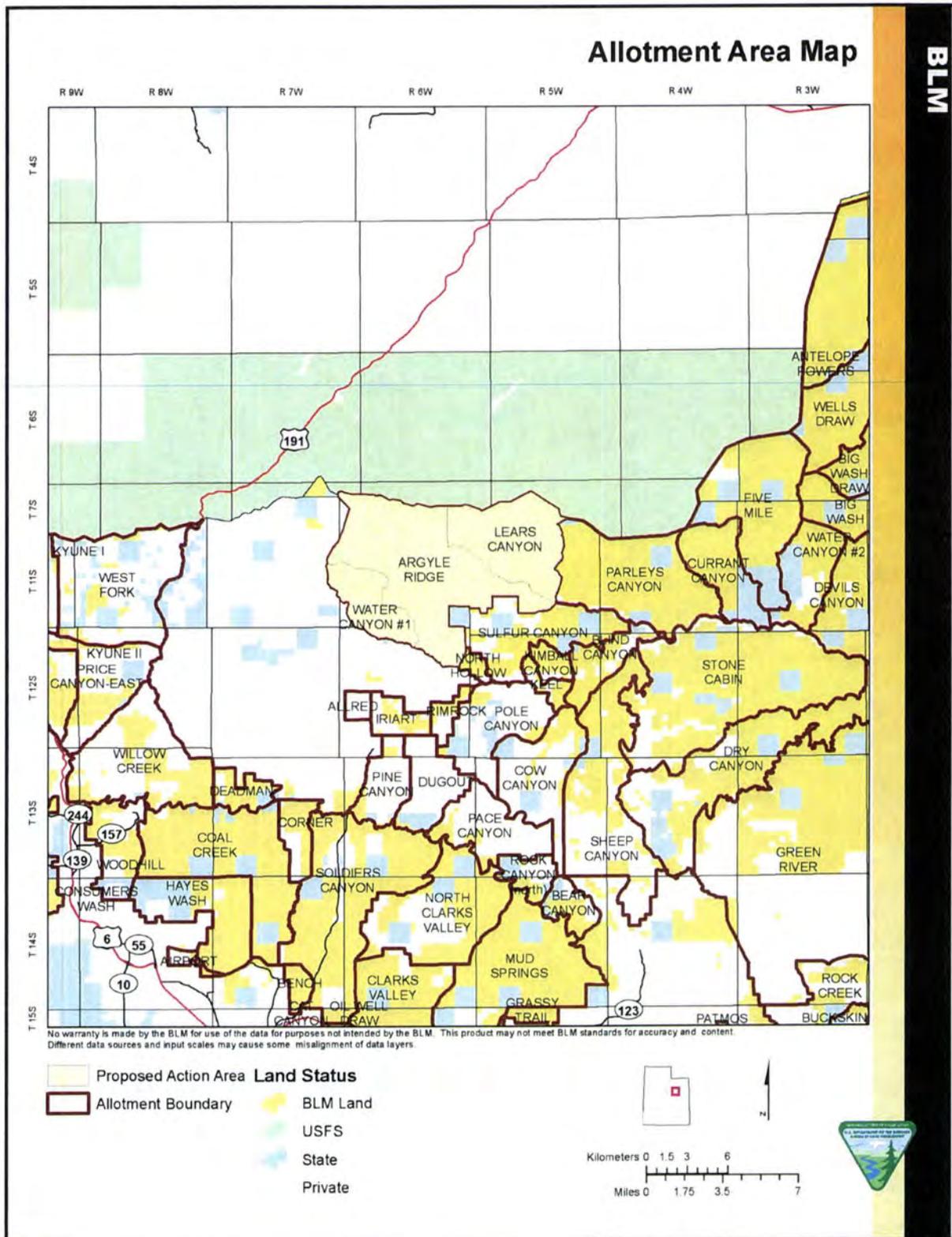
Argyle Ridge Allotment is currently authorized for 540 AUMs on public lands (10 AUMs on state lands and 504 AUMs on private land).

Lears Canyon is currently authorized for 308 AUMs on public lands.

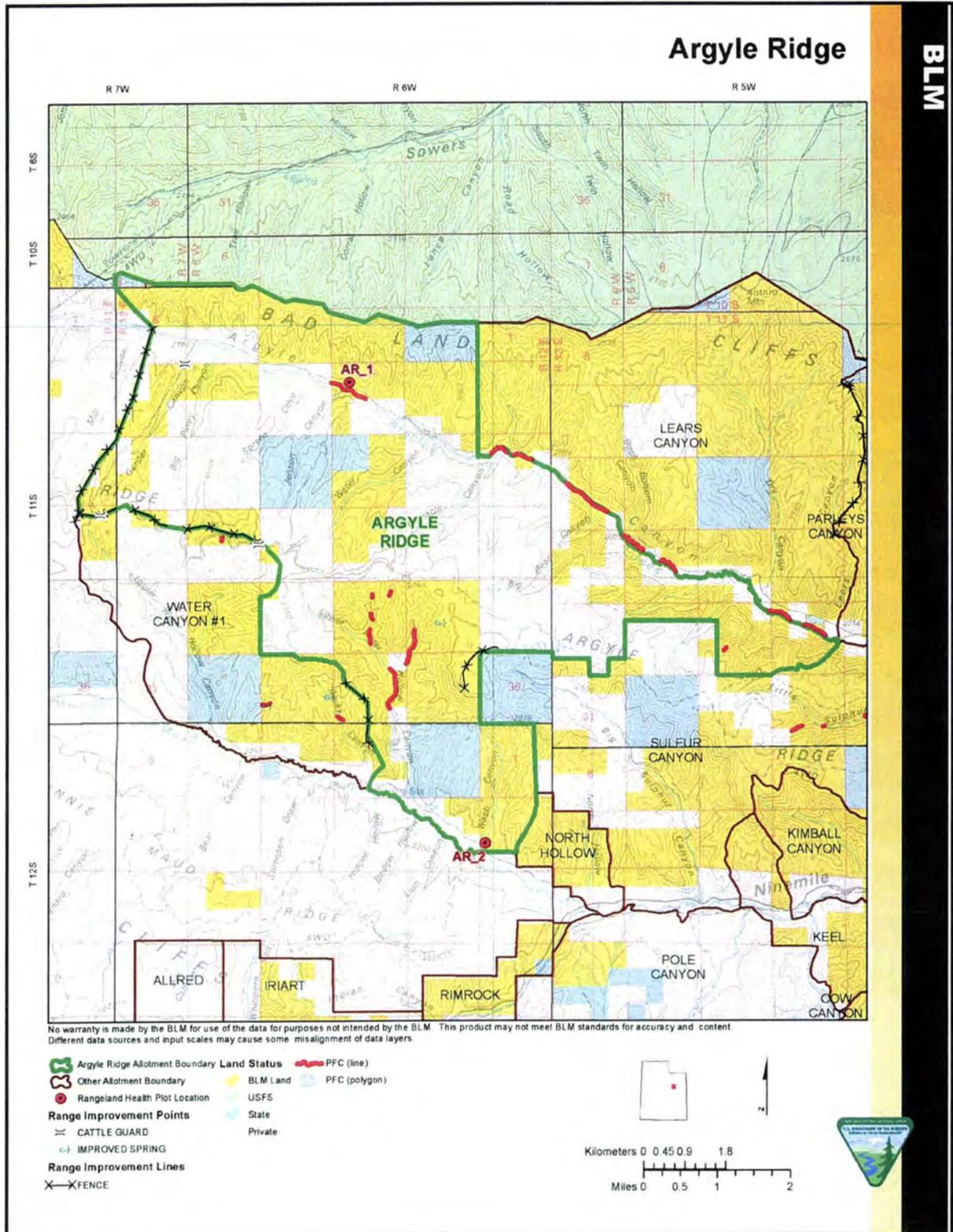
Water Canyon #1 is currently authorized for 153 AUMs on public lands.

Cattle are the majority class of livestock permitted for these three allotments, although Lears Canyon is currently allowed 30 AUMs for horses as shown in Table 1.

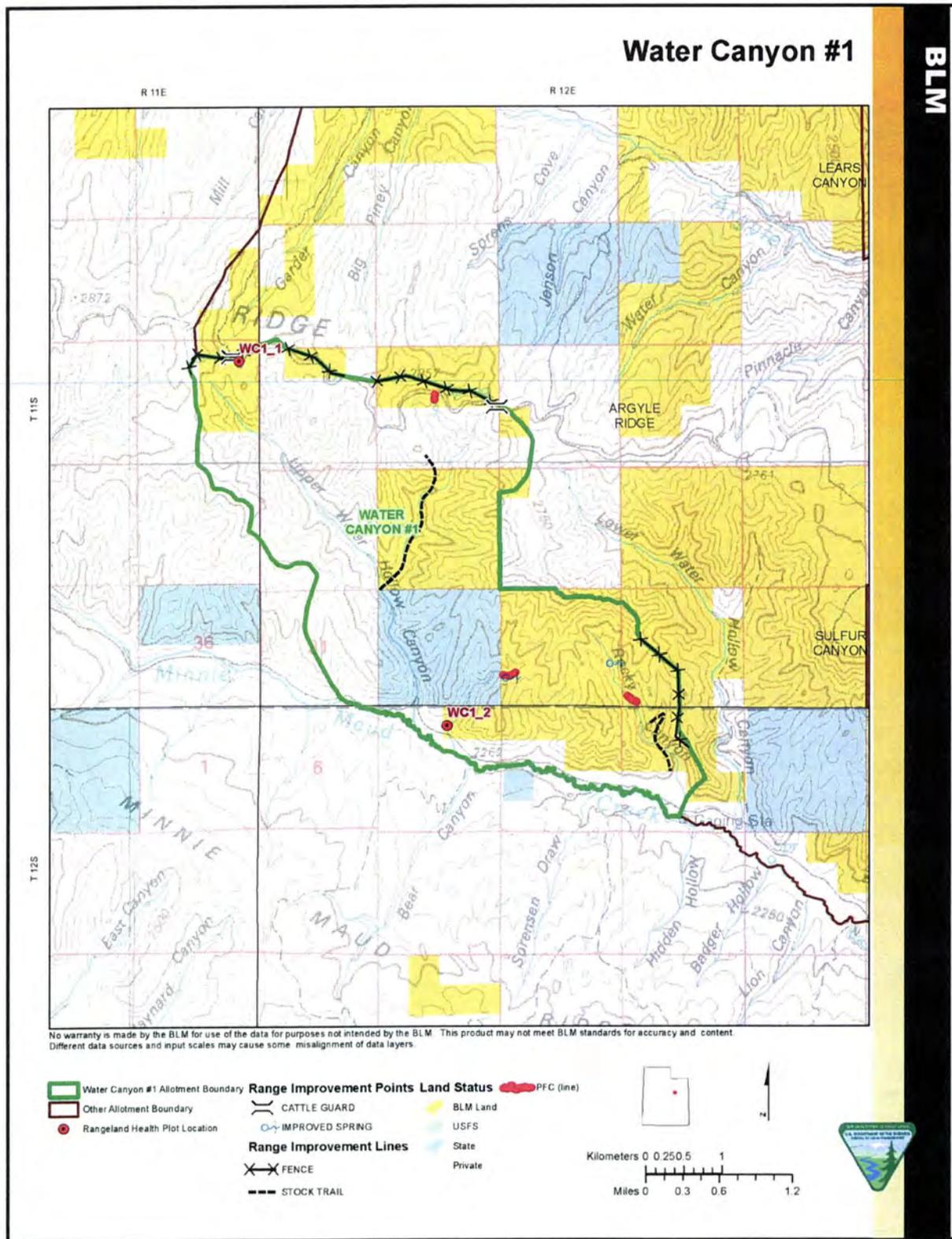
Map 1: Allotment Area Overview



Map 2: Argyle Ridge Allotment



Map 4: Water Canyon #1 Allotment



1.3 Need for the Proposed Action

Grazing applications have been received from the current livestock permittees to renew their 10-year grazing permits. The permittees' need for the proposed action is to continue livestock grazing on the permits currently authorized to them. Grazing use would continue through utilization of rangeland forage at proper use levels, and continued proper use of water and spatial resources, while maintaining compliance with, or making significant progress towards meeting the Utah BLM's Standards for Rangeland Health.

The BLM's need for the proposed action is to allow livestock grazing to continue on the three allotments in a manner that would meet multiple use objectives of the BLM, and the current VFO RMP. Grazing allotments would be managed to be in compliance with Utah Standards for Rangeland Health and the BLM Fundamentals of Rangeland Health and Federal Land Policy and Management Act (FLPMA) and under the authority of the Taylor Grazing Act (TGA).

Under 43 CFR (Code of Federal Regulations) 4130.2, the BLM is required to offer grazing permits for a period of ten years, or for the length of a base property lease that is no less than three years. BLM policy requires that all grazing permits be fully analyzed through the NEPA process using the best available information needed to complete environmental impact analysis. Following the analysis, grazing permits would be cancelled and reissued with any modifications and/or additional Terms and Conditions included.

1.4 Purpose(s) of the Proposed Action

Livestock grazing is an accepted and valid use of the BLM multiple-use mission and its range management program, as provided for by the Taylor Grazing Act (TGA), Federal Land Policy and Management Act (FLPMA), and the Public Rangelands Improvement Act (PRIA), as amended. Regulations controlling livestock grazing on public lands are found in 43 CFR 4100. The objective of these regulations are to "promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions; to promote the orderly use, improvement and development of the public lands; to establish efficient and effective administration of grazing of public rangelands; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands."

An interdisciplinary (ID) team developed this environmental assessment (EA) for the purpose of analyzing the potential site specific effects of livestock grazing on resources that may be affected in Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. An ID Team Checklist has been prepared and is found in Appendix A. This approach is used to ensure that management actions on public lands conform to the appropriate land use plans, are site specific, and balance uses between different resource values. The Fundamentals of Rangeland Health (43 CFR 4180) that includes watersheds, ecological conditions, water quality, and Threatened & Endangered Species habitat have been analyzed and summarized in the EA.

1.5 Conformance with BLM Land Use Plan(s)

The 2008 Vernal Field Office Resource Management Plan and Record of Decision has determined livestock grazing is a compatible use on public lands within these three allotments, within the authority of the 1934 Taylor Grazing Act (TGA), the 1976 Federal Land Policy and Management Act (FLPMA), and the grazing administration regulations contained in 43 CFR 4100. The alternatives considered in detail in this EA are in conformance with the direction set

out in the VFO RMP, with the exception of the no-grazing alternative which is considered here, but was not analyzed in the RMP.

1.6 Relationship to Statutes, Regulations, or other Plans

1.6.1 Taylor Grazing Act (TGA) of 1934

The proposed action and alternatives conforms to the following sections:

Section 1: “. . . he Secretary of the Interior is authorized, in his discretion, by order to establish grazing districts or additions thereto and/or to modify the boundaries thereof, . . . which in his opinion are chiefly valuable for grazing...”.

Section 3: “The Secretary of the Interior is hereby authorized to issue or cause to be issued permits to graze livestock on such grazing districts...Such permits shall be for a period of not more than ten years, . . . in the discretion of the Secretary of the Interior, who shall specify from time to time numbers of stock and seasons of use.

1.6.2 Federal Land Policy and Management Act (FLPMA) of 1976

The proposed action and alternatives conforms to the following section:

Sec. 402, “. . . permits and leases for domestic livestock grazing on public lands issued by the Secretary ... shall be for a term of ten years subject to such terms and conditions the Secretary concerned deems appropriate and consistent with the governing law, including, but not limited to, the authority of the Secretary concerned to cancel, suspend, or modify a grazing permit or lease, in whole or in part, pursuant to the terms and conditions thereof, or to cancel or suspend a grazing permit or lease for any violation of a grazing regulation or of any term or condition of such grazing permit or lease.”

1.6.3 Duchesne County’s General Land Use Plan

“To support the wise use, conservation and protection of public lands and resources, including well-planned management prescriptions” (page 11).

“To ensure that public lands are managed for multiple use and sustained yield and to prevent waste of natural resources. Further, these lands should be managed to prevent the loss of resources (and private property that may be located within or near public lands) from catastrophic events and to protect the safety and health of the public” (page 13).

1.6.4 Additional Acts and Applicable Policies

- 43 CFR 4100 Grazing Administration
- BLM Utah Riparian Management Policy, UT-2005-091, September 2005
- Endangered Species Act (ESA) of 1973, as amended
- National Environmental Policy Act of 1969
- Public Rangelands Improvement Act (PRIA) of 1978
- Section 106 of the National Historic Preservation Act of 1966 (as amended)

- Standards of Quality for Waters of the State, R317-2-6, Utah Administrative Code, December 1997

“Compliance with all applicable laws and regulations,” is the policy of the BLM. This includes consultation, coordination and cooperation with affected individuals, interested publics, States and Indian Tribes, completion of the applicable level of NEPA review; and consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act, as appropriate.

The alternatives within this EA consider 43 CFR 4100.0-8, which states, in part:

“The authorized officer shall manage livestock grazing on public lands under the principle of multiple use and sustained yield, and in accordance with applicable land use plans.”

The alternatives also consider 43 CFR 4130.2(a) which states, in part:

“Grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the BLM that are designated as available for livestock grazing through land use plans.”

More specifically when dealing with rangeland health standards, 43 CFR 4110.3 directs the authorized officer to:

“. . . periodically review the grazing preference specified in a grazing permit or lease and make changes in the grazing preference as needed to manage, maintain or improve rangeland productivity, to assist in making progress towards restoring ecosystems to properly functioning conditions, to conform with the land use plans . . . , or to comply with the provisions of subpart 4180 of this part.”

1.7 Rangeland Health Standards

Regulations found in 43 CFR 4180.2(b) direct the Utah State Director, in consultation with affected BLM resource advisory councils, to develop state rangeland health standards. Subsequent to these regulations, BLM approved the following standards for rangeland health for BLM-administered public lands in Utah (BLM, 1997).

- Standard 1:** Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform.
- Standard 2:** Riparian and wetland areas are in properly functioning condition. Stream channel morphology and functions are appropriate to soil type, climate and landform.
- Standard 3:** Desired species, including native, threatened, endangered, and special-status species, are maintained at a level appropriate for the site and species involved.
- Standard 4:** BLM will apply and comply with water quality standards established by the State of Utah (R.317-2) and the Federal Clean Water and Safe Drinking Water Acts. Activities on BLM lands will fully support the designated beneficial uses described in the Utah Water Quality Standards (R.317-2) for surface and groundwater.

In addition, the alternatives are required to comply with the following laws and/or agency regulations, other plans, and are consistent with Federal, State and local laws, regulations, and plans, to the maximum extent possible.

1.8 Identification of Issues

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of one of the alternatives, as well as through involvement with the public and input from a BLM interdisciplinary team (Appendix A). Public involvement consisted of posting the proposal on the Utah BLM Environmental Notification Bulletin Board (ENBB) on January 29, 2009. The ENBB entry was updated as of April 22, 2013. No comments have been received.

The Interdisciplinary Team Checklist does lists all resources considered but not necessarily analyzed. The elements in the checklist are subject to the requirements specified in statute or executive order and must be considered in all EA's (BLM H-1790-1).

Issues identified through the scoping process listed above include the following:

1.8.1 Areas of Critical Concern (ACEC)

Lears Canyon ACEC

1.8.2 Invasive Plants, Noxious Weeds, Soils, and Vegetation

The following invasive/noxious weed species occur on one or more of the allotments:

- *Bromus tectorum*, cheatgrass
- *Centaurea repens*, Russian knapweed
- *Cirsium canadensis*, Canada thistle
- *Cirsium vulgare*, bull thistle
- *Cynoglossum officinale*, houndstongue
- *Lepidium latifolium*, tall white-top
- *Tamarisk ramosissima*, tamarisk

1.8.3 Livestock Grazing and Rangeland Health

1.8.4 Plants: BLM Sensitive

- *Aquilegia scopulorum* var. *goodrichii*, Goodrich's columbine
- *Erigeron untermannii*, Untermann's fleabane
- *Mentzelia goodrichii*, Goodrich's blazingstar
- *Phacelia goodrichii*, Argyle Canyon phacelia
- *Thelesperma caespitosum*, Uinta greenthread

1.8.5 Plants: Wetland Riparian

Analysis for riparian vegetation and related proper functioning condition assessments are included under the water-related sections of the EA (see below).

1.8.6 Water: Ground Water Quality, Hydrologic Conditions, and Surface Water Quality

1.8.7 Wildlife:

- Migratory birds, including raptors
- Important habitat for big game species
- Federally listed and candidate species, including their designated habitats

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternative A - No Action: Continue grazing as permitted under existing terms and conditions.

Under this alternative, livestock grazing would occur during the current seasons of use, at the permitted use levels (AUMs) identified in Table 1, and under the existing terms and conditions of the permit. The permits would be re-issued to six permittees. The class of livestock on the allotments would be cattle, with the exception of Day Family Living Trust, which is authorized 30 AUMs (approximately 3 head) for horses in the Lears Canyon Allotment. The season of use is outlined in Table 1. Under this alternative, the permit would be re-issued with the current Standard Terms and Conditions, found in Appendix H.

2.2 Alternative B – Proposed Action: Cancel Existing Grazing Permit and Issue New Permit with Season-of-Use Modifications

Under this alternative, livestock grazing would occur within modified seasons of use, however, the total allowable AUMs would remain identical to the existing permits. The season-of-use changes are identified in Table 2. Minor season of use changes based on permittee proposal are included for Argyle Ridge, where permittees would now use the allotment on the same schedule, for ease of compliance and monitoring. The Fasselin and Day Family Trust permits in Lears Canyon include BLM changes to precluded March through May use in order to avoid grazing during the earliest part of the growing season. The seasons of use are compared in Table 2.

Allotment Name	Permittee	Permit Number	Livestock			Permitted Use AUM's	% Public Land
			Kind	Existing Season of Use	Proposed Season of Use		
Argyle Ridge	Fasselin / Jensen	4300242	Cattle	06/15 – 11/01	06/01 – 10/31	149	20
Argyle Ridge	Oman	4300303	Cattle	06/01 – 10/15	06/01 – 10/31	35	54
Argyle Ridge	Staker	4300257	Cattle	06/01 – 10/15	06/01 – 10/31	34	49
Argyle Ridge	Terry	4308073	Cattle	06/15 – 11/15	06/01 – 10/31	121	20
Lears Canyon	Fasselin / Jensen	4300242	Cattle	05/15 – 06/15	06/01 – 10/31	278	100
Lears Canyon	Day Family Living Trust	4300657	Horse	03/01 – 02/28	06/01 – 10/31	30	83
Water Canyon #1	JTJJ Enterprises, LTD	4300433	Cattle	06/15 – 10/10	06/15 – 10/10	153	40

The new permit would be issued with Standard Terms and Conditions, and the following modification:

1. Manage the allotment for the following utilization levels of key species to meet the desired objectives for vegetation composition.
 - Combined livestock and wildlife use of key upland species would not exceed 50% on grasses and forbs.
 - Provide for bank protection and sediment entrapment, riparian areas would be managed for the following utilization levels:
 - a. Key herbaceous riparian vegetation, where stream bank stability is dependent upon it, would have a minimum stubble height of 4 inches on the stream bank along the green line at the end of the growing season.
 - b. Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals.

2.3 Alternative C – No Grazing

Under this alternative, no livestock grazing would occur on the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments for a grazing cycle of ten years. As with other alternatives analyzed in this EA, if this alternative is selected, it would be re-evaluated after the typical ten-year grazing permit cycle, based on all available allotment information, including ongoing Rangeland Health and riparian monitoring data.

This alternative is carried forward here for analysis based on interested public requests received in Utah for No Grazing alternatives to be included within the range of alternatives. The VFO RMP did not consider a No Grazing alternative.

3.0 AFFECTED ENVIRONMENT

3.1 General Setting

The Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments are located in Duchesne County with a small part of two of the allotments (Argyle Ridge and Water Canyon #1) in Carbon County, Utah. The three allotments are located approximately 40 to 50 miles southwest of Myton, Utah. The allotments consist primarily of upland sagebrush and forested plant communities intersected by steep slopes located between ephemeral and erosive V-shaped drainages and washes.

Elevations of the project area range from 6,000 feet to 8,250 feet. Average annual precipitation ranges from 10 to 15 inches, and is received primarily during the winter and late summer months, although this has been shifting slightly to spring moisture in more recent years, although no rain-can collection stations or RAWS sites are located within many miles of the allotments to confirm this anecdotal observation.

3.2 Resources/Issues Brought Forward for Analysis

The affected environment of the project area was considered and analyzed by an interdisciplinary team as documented in the Interdisciplinary Team Analysis Record Checklist (Appendix A). The checklist indicates which resources of concern are either not present in the project area or would not be impacted to a degree that requires detailed analysis. Resources which could be impacted to a level requiring further analyses are described in Chapter 3 and analyzed for impacts in Chapter 4.

3.2.1 Areas of Critical Environmental Concern (ACECs)

There are no ACEC designations located in Argyle Ridge and Water Canyon #1 Allotments. An ACEC is designated in the Lears Canyon Allotment and comprises 1,375 acres. The rationale for designation was listed in the RMP as relevant and important relict plant communities. The Diamond Mountain Resource Area Plan and Record of Decision (1994) states:

“Retain the area’s present natural Douglas Fir-mountain browse and pinyon-juniper communities, as a comparison or control area and to provide/set aside an area in a late to climax ecological stage for research and/or educational purposes within this vegetation community type”.

To date, no activity plan and associated site-specific NEPA have been completed for Lears Canyon or other ACEC’s in the VFO with vegetation-related objectives. No site-specific Decisions have been put into place, therefore the area remains unfenced within the grazing allotment and the Lears Canyon ACEC does not receive any more or less grazing by either livestock than other areas of the allotment. (Appendix I, ACEC photos)

The designation area has been used and is accessible to livestock for grazing. Under the No Action Alternative, the Lears Canyon ACEC would be accessible to livestock from March through May during the early part of the growing season. Also, under the No Action Alternative livestock use in the ACEC designation area would continue to occur in during the early stages of the growing season for the involved plant communities.

The proposed action would curtail existing livestock use throughout the Lear’s Canyon grazing allotment, including the unfenced ACEC, during the early part of the growing season for understory species and during very early establishment and recruitment of woody species.

Under the no grazing alternative, herbivory from livestock would not occur in the ACEC designation area.

3.2.2 Invasive Plants and Noxious Weeds

The following invasive/noxious weed species occur on one or more of the allotments:

- *Bromus tectorum*, cheatgrass Not listed by the State of Utah
- *Centaurea repens*, Russian knapweed Class C, State of Utah noxious weed*
- *Cirsium canadensis*, Canada thistle Class C, State of Utah noxious weed*
- *Cirsium vulgare*, bull thistle Not listed by the State of Utah
- *Cynoglossum officinale*, houndstongue Class C, State of Utah noxious weed*
- *Lepidium latifolium*, tall whitetop Class A, State of Utah noxious weed***
- *Tamarisk ramosissima*, tamarisk Class C, State of Utah Noxious weed*

***Class A weeds “have a relatively low population size within the State and are of highest priority being an *Early Detection Rapid Response* (EDRR) weed.” (www.utahweed.org, 2013)

**Class B weeds “have a moderate population throughout the State and generally are thought to be controllable in most areas.” (www.utahweed.org, 2013)

*Class C weeds “are found extensively in the State and are thought to be beyond control. Statewide efforts would generally be towards containment of smaller infestations.” (www.utahweed.org, 2013)

According to VFO GIS data files, a few isolated occurrences for houndstongue are recorded in all three allotments. Field visits, however, indicate widespread infestation of this Utah Noxious Weed. Similar to the cheatgrass infestations in other regions of the Field Office, this species has become naturalized throughout the Argyle Ridge area as well as in most of the allotments following the majority of the Ridge. Range vegetation photos (Appendix C, Houndstongue comparison photos 1, 2 and 3) from 1981 and 1983 show the relative abundance to be similar to spring 2013 conditions. It should be noted that these photos were not taken at the same location; however, they represent an area wide comparison.

Houndstongue mapping in the allotments is highly under-represented owing to the abundance of houndstongue and the time-intensive requirements for mapping that would be beyond the ability of the BLM to map at a site-specific scale, even under ideal funding conditions. The species is present in all but riparian areas and naturally barren or the steepest erosive hillsides. The species, however, does not occur in monocultures, and native vegetation does occur with, and competes with it somewhat readily as apparent in Rangeland Health paced transects. (Appendix D).

Fire events, both large and small in the Argyle Ridge Allotment have thought to have also contributed to houndstongue infestations as well as other vectors such as county and two-track road and trail use, livestock and wildlife travel, recreation use and lack of early eradication efforts or effectiveness and obvious affinity and naturalization of the species for this elevation and soils, among other unknown factors, have all likely contributed to the current widespread abundance.

The relative influence of livestock grazing, as a contributing factor to houndstongue infestation has not been quantified in this area. Houndstongue would, however, be considered one of the vectors in spreading seed or propagules. Under the no action and proposed action alternatives, this vector would remain. Grazing is likely to contribute to increased houndstongue infestations because of the plant's association with disturbance, resistance to defoliation and herbivory, and tendency of seeds to stick in fur and fleece. Furthermore, houndstongue has the potential to poison livestock and wildlife that might graze it.

Under Alternative C (No Grazing) spread of houndstongue would likely be reduced.

A single Canada thistle infestation is currently mapped along the western edge of the Water Canyon #1 Allotment.

Cheatgrass is present in uplands and dandelions (*Taraxacum officinale*) is present in riparian areas, however these species are not presently on the 2013 Utah Noxious Weed Class A, B or C list. (www.utahweed.org/weeds.htm 2013) Other mapping locations also show tamarisk, tall whitetop, Russian knapweed and bull thistle in the allotment, although not to the wide extent of houndstongue.

3.2.3 Soils and Vegetation

Data from the VFO GIS datafiles provided a mapped eco-site type coverage for the Argyle Ridge and Lears Canyon Allotments, however, mapping was not completed for the Water Canyon #1 Allotment (see Map 5: Ecological Site Mapping). The vegetation in Water Canyon was found to contain similar eco-site types during 2013 Rangeland Health field visits. There are six eco-site large-scale plant associations) mapped for the area; Conifer (mapped as Douglas fir / mountain shrub in Lears Canyon), pinyon/juniper conifer, mountain big sagebrush, greasewood, one mapped aspen clone, and badlands/rock outcrop.

Douglas fir/mountain shrub is mapped as more prevalent in the Argyle Ridge Allotment, while pinyon-juniper is more prevalent in the Lears Canyon Allotment. Both allotments contain interspersed mountain big sagebrush sites with mixed aspen and conifer overstory vegetation in patchy mosaics throughout the area. Greasewood occurs in the bottomlands adjacent and upslope from riparian vegetation. Greasewood flats, however, move up quickly into mountain big sagebrush types at upper elevations. The lower elevations in the allotments contain more widespread greasewood communities.

Understory forage and vegetation is dominated by mountain brome, various bluegrass species, and blue-bunch wheatgrass bunchgrasses. Annual bromes are present, but not in monoculture or as a dominant part of the communities, in most areas. Rangeland Health data was obtained in 2008 and 2013, following drought in both years, and this could limit the expression of cheatgrass in the transect or photo data.

All three allotments in this analysis do not have National Resource Conservation Service (NRCS) mapping completed at soil map unit level resolution. VFO GIS layer files 2013 geology mapping at the 1:100,000 level resolution confirms that Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments generally lie within the Upper and Middle portions of the Green River formation. This geology is interspersed with slopes labeled and verified in the field as Landslide areas. The northern-most sections of Argyle and Lears Canyon Allotments do rise slightly in geological terms to the Lower Uinta formation intermixed with sandstone and limestone facies of the Bryant formations. (See Map 6: 1:100,000 VFO GIS Geology Layer, 2013).

Greasewood flats and swale areas with deposited material from the Landslide sideslopes and alluvial events are deeper (can reach several yards in depth) with greater organic material, but tend to be sodic. The soils in Argyle Ridge, Lears Canyon, and Water Canyon #1 are generally non-permeable and may have strong surface hydrophobic qualities, especially in the absence of biocrust (Loope, 1972). Landslide geographic areas of the allotments have limited biocrusts, owing in part to ongoing erosion, steep slopes and limited opportunity for plant growth and soil organic activity to develop.

Although soils in the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments are shallow and typically low in nitrogen and total carbon, bunchgrass and understory forage palatable to livestock and wildlife can be abundant (> 1000 pounds/acre dry weight) in mountain sagebrush areas during an average moisture year (NRCS 2010 Ecological Site Descriptions).

Soils from these parent materials at these elevations and throughout these allotments derived from these sedimentary formations are typically shallow, low-organic soils and subsoils over bedrock (often fractured) found at depths of less than one to two meters. (See Photo 1)

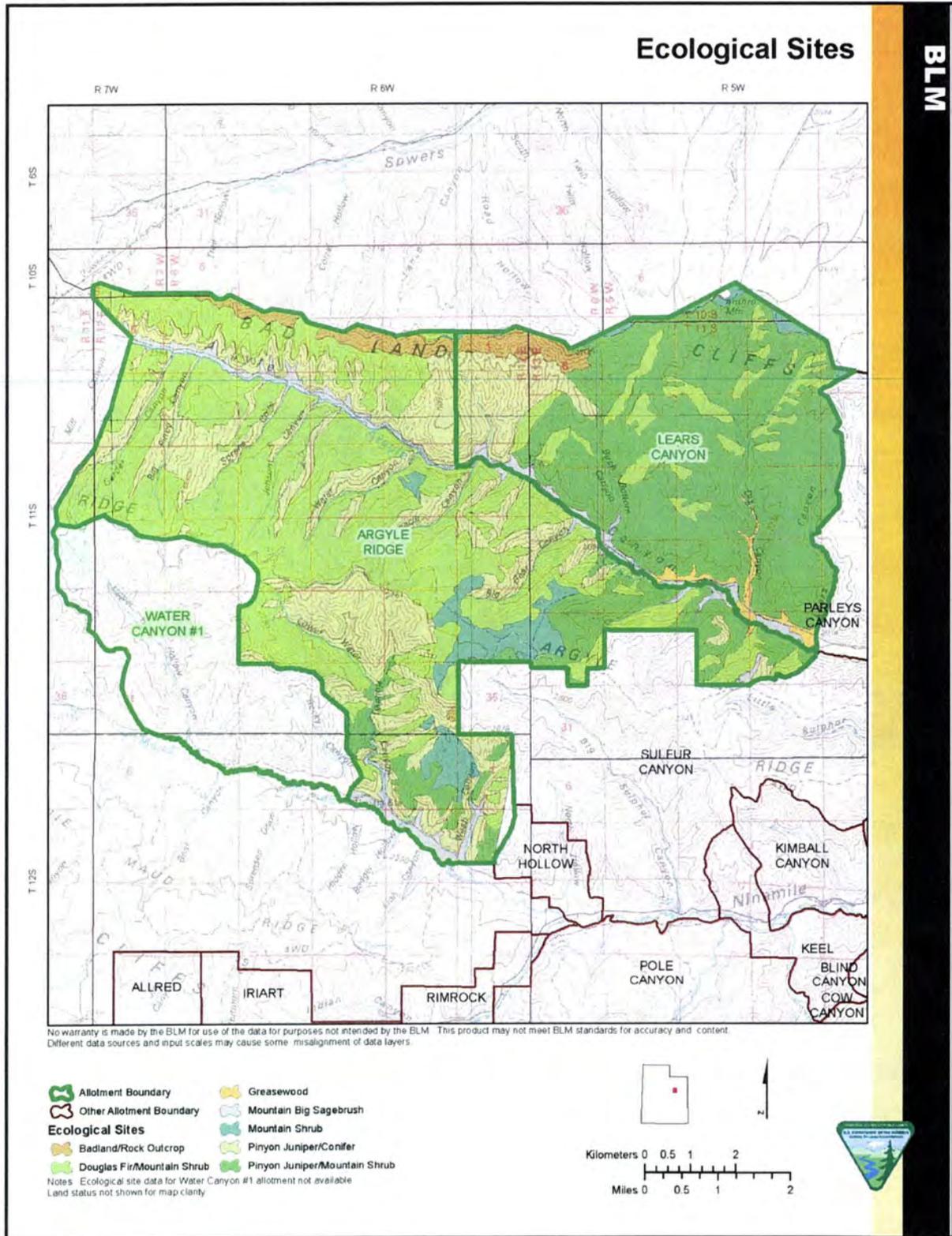


Photo 1: Argyle Ridge geology/soils Highway 191, mile marker 266, Utah

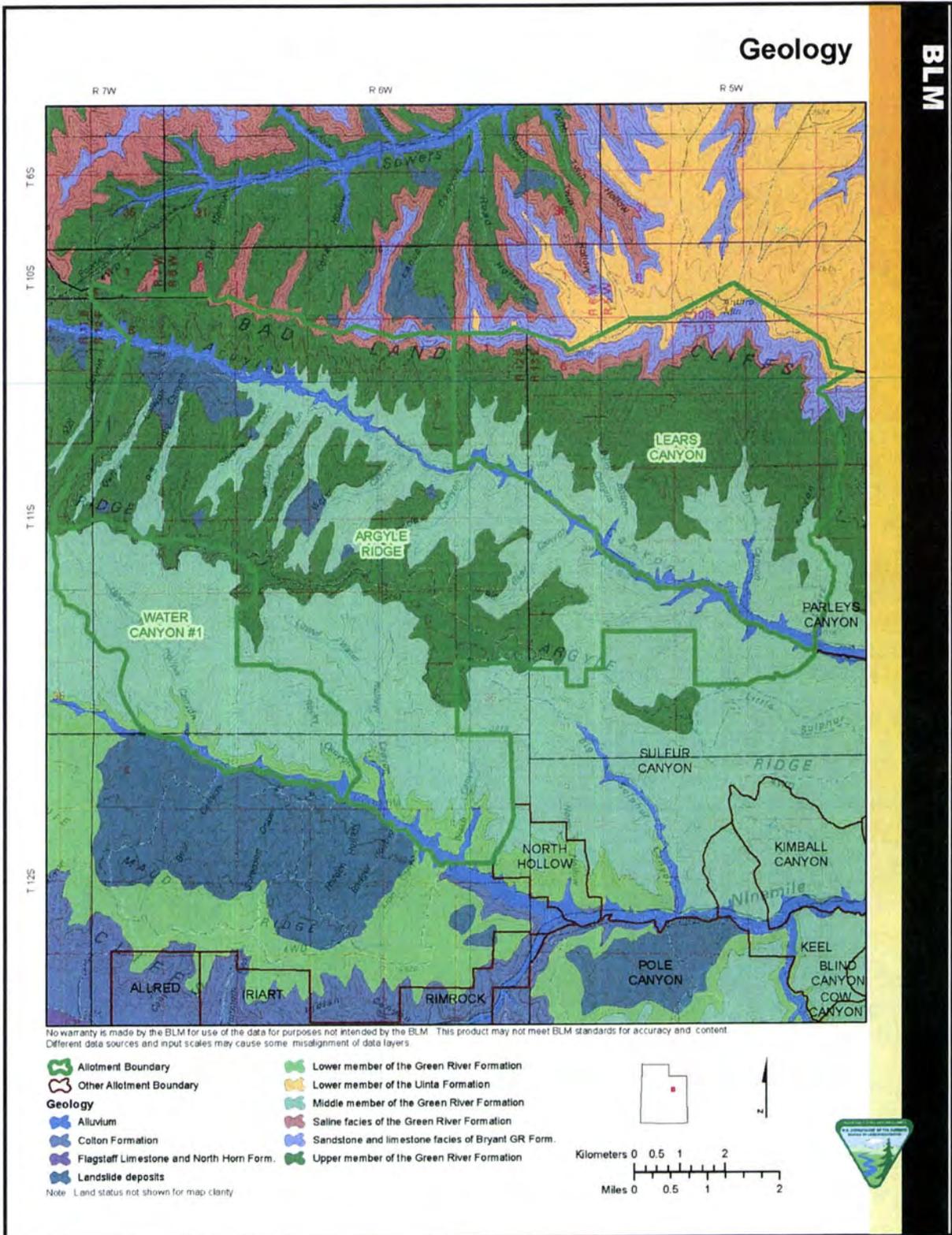
3.2.4 Livestock Grazing and Rangeland Health

The following addresses the affected environment and is consistent for both the No Action and Proposed Action Alternatives. The affected environment description for the No Grazing Alternative is found in Section 3.6.

Map 5: Ecological Site Mapping



Map 6: 1:100,000 VFO GIS Geology Layer, 2013



Livestock grazing occurs within these allotments with the intent of managing AUMs for livestock and wildlife, while maintaining ecosystems that meets the Standards for Rangeland Health. Livestock movement and use of the allotments is controlled by natural topographic boundaries and some limited fencing, especially at the entrances of canyons.

Authorized livestock use in the Argyle Ridge Allotment was 710 AUMs, but in 2002, 170 AUMs were suspended, leaving 540 AUMs. The Lears Canyon Allotment was allocated for 463 AUMs in 1983, but has fluctuated to as low as 233 AUMs in 1993 due to monitoring studies and available forage. Most recently AUMs have been adjusted to 308. Water Canyon #1 was rated to authorize 153 AUMs in 1967, and the authorized use remains at 153 AUMs. Argyle Ridge has had its AUMs reduced by 170 over the past 30 years. The Lears Canyon Allotment has had its AUMs reduced by 155 over the past 30 years. Total reductions on the three allotments amount to 355 AUMs or a reduction of 24.5%.

3.3 2008 VFO RMP Rangeland Concerns Overview

3.3.1 Argyle Ridge Allotment

The Argyle Ridge Allotment is listed as an “Improve” management category in the Vernal Field Office Record of Decision and Approved Resource Management Plan (2008, Appendix J of ROD). Rangeland concerns in the RMP listed in 2008 included: Infestation of unwanted species, livestock control, season of use, insufficient forage, excessive slope and recreation conflicts.

Site specific analysis of Infestation of Unwanted Species will be addressed in the noxious weed portion of the EA. It should be noted that VFO photo plots show relatively similar infestation of houndstongue in 1983 (Appendix C, Photo 2). Livestock-related concerns, such as control, season-of-use and insufficient forage will be addressed in the Livestock Grazing and Rangeland Health portions of the EA in Chapters 3 and 4.

Excessive and steep slopes exist throughout the Vernal Field Office and are not considered primary use areas for livestock. For purposes of this analysis, steep slopes exceed 30% grade (Maps 6-8, Appendix K). This gradient is being used as a baseline established using observable estimates of livestock use in the area and is a median value from the definition of steep slopes provided in the RMP. (2008 VFO RMP / ROD, Appendix K).

Dispersed recreation occurs in the Argyle Creek drainage, especially along the creek, however, conflicts between uses were not brought forward and are therefore, not analyzed in this EA.

3.3.2 Lears Canyon Allotment

The Lears Canyon Allotment is listed as a “Maintain” management category in the Vernal Field Office Record of Decision and Approved Resource Management Plan (2008, Appendix J of RMP / ROD). The rangeland concerns consisted primarily of permitted Season of Use.

Livestock-related concerns will be addressed in the livestock grazing and Rangeland Health sections of the EA in Chapters 3 and 4. Although the RMP does not list the Lears Canyon ACEC as a concern within the grazing sections, it is addressed further in this document using material from the Diamond Mountain Resource Area Resource Management Plan and Record of Decision (1994).

3.3.3 Water Canyon #1 Allotment

The Water Canyon #1 Allotment is listed as an “Improve” management category in the Vernal Field Office Record of Decision and Approved Resource Management Plan (2008, Appendix J of ROD). Rangeland concerns included infestation of unwanted species, vegetation diversity, insufficient forage, excessive slope, insufficient water and recreation conflicts.

Site specific analysis of infestation of unwanted species will be addressed in the noxious weed portion of the EA. Livestock-related concerns, such as vegetation diversity, insufficient water and insufficient forage will be addressed in the livestock grazing and Rangeland Health portions of the EA. Excessive and steep slopes exist throughout the Vernal Field Office and are not considered primary use areas for livestock. Dispersed recreation does occur throughout this allotment, but conflicts have not been identified.

3.4 Alternative A – No Action

Under this alternative, Term Grazing permits would be cancelled and re-issued to six permittees utilizing the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. Livestock grazing would occur during the current seasons of use and under the same permitted use (AUMs) identified in Table 1. Standard Terms and Conditions for Term Grazing Permits would remain in place. (Appendix H) The class of livestock on the allotments would remain as cattle, with the exception of Day Family Living Trust which currently runs 30 AUMs of horses (approximately 3 head) in the Lears Canyon Allotment.

The Lears Canyon Allotment season of use begins March 1 for horses and May 15th for cattle.

Plateaus and canyons in the three allotments are dissected at regular intervals by erosive, flashy, ephemeral drainages located between steep side slopes. Visual site inspections during 2013 Rangeland Health assessments indicated that limited livestock use and use of limited palatable forage was not excessive on the allotments’ side slopes. No rilling or excessive trailing (although game trails do exist) is evident. Livestock use is generally confined to canyon bottoms or upland plateau areas. Livestock generally disperse well within the allotments by utilizing both ephemeral and live water sources.

3.5 Alternative B – Proposed Action

Under this alternative, Term Grazing permits would be cancelled and re-issued with season of use modifications, and additional Terms and Conditions to six permittees utilizing the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments.

Under the Proposed Action Alternative, livestock grazing would be modified in terms of seasons of use, however, these changes would not result in total AUM changes to the permits. The permittees have proposed minor season of use changes to the Argyle Ridge Allotment to standardize turn-out and off-dates between the four permittees. BLM has proposed changes in the Lears Canyon Allotment to precluded March through May early season grazing use. The proposed seasons of use, AUM totals, and livestock numeric changes are compared in Table 2.

The season-of-use adjustments on the Argyle Ridge Allotment are expected to have minor vegetation responses, although two of the permits will now run approximately two weeks earlier in the growing season as indicated in Table 3. Although this will result in a limited amount of increased livestock herbivory earlier in the growing season, monitoring will continue, to assess changes in Rangeland Health conditions.

Table 3: Animal Number and AUMs

Allotment Name	Permittee	Kind	Existing Season of Use				Proposed Season of Use			
			Animal #s	On Date	Off Date	AUMs	Animal #s	On Date	Off Date	AUMs
Argyle Ridge	Fasselin / Jensen	Cattle	162	06/15	11/01	149	150	6/1	10/31	149
Argyle Ridge	Oman	Cattle	14	06/01	10/15	34	14	6/1	10/31	34
Argyle Ridge	Staker	Cattle	15	06/01	10/15	33	14	6/1	10/31	33
Argyle Ridge	Terry	Cattle	120	06/15	11/15	122	121	6/1	10/31	122
Lears Canyon	Fasselin / Jensen	Cattle	264	05/15	06/15	278	64	6/1	10/31	278
Lears Canyon	Day Family Living Trust	Horse	3	03/01	02/28	30	6	6/1	10/31	30
Water Canyon #1	JTJJ Enterprises, LTD	Cattle	98	06/15	10/10	153	98	6/15	10/10	153

Although the current seasons of use in these allotments are allowing conditions to meet Rangeland Health and PFC standards in all three allotments, the proposed season of use changes in the Lears Canyon Allotment should provide increased establishment and vigor to early, cool-season plant species by delaying turn-out by 30 to 90 days at the beginning of the growing season.

Overall livestock use patterns on the landscape and cattle dispersal is expected to remain similar to current use and the No Action Alternative, regardless of season-of-use changes.

The new permits would be issued with Standard Terms and Conditions, as well as the following utilization modification:

- Manage the allotment for the following utilization levels of key species to meet the desired objectives for vegetation composition.
- Combined livestock and wildlife use of key upland species would not exceed 50% on grasses and forbs.
- Provide for bank protection and sediment entrapment, riparian areas would be managed for the following utilization levels:
- Key herbaceous riparian vegetation, where stream bank stability is dependent upon it, would have a minimum stubble height of four inches on the stream bank along the green line at the end of the growing season.
- Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals.

3.6 Alternative C – No Grazing

Under this alternative, livestock grazing would not occur on the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments for a grazing cycle of ten years. As with other alternatives analyzed in this EA, at the end of the ten year grazing permit cycle, the decision would be re-evaluated. This re-evaluation would include, as it does here, available allotment use information and monitoring data. This alternative is carried forward for analysis based on interested public requests for a no grazing alternative to be included in the range of alternatives for grazing permit renewal EA's.

It should be noted and is common to all alternatives, that the BLM, at its discretion, may withhold and/or modify grazing permits at the agency's discretion, if the Authorized Officer determines that rangelands are not in compliance or trending toward compliance with Fundamentals of Rangeland Health, Guidelines for Grazing Management, or Standards for Rangeland Health.

3.7 Rangeland Health

Range Condition Scores from older Argyle Ridge Allotment data ranged from Fair to Good. (Appendix D). The Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments were assessed for compliance with "*The Utah Standards for Rangeland Health*" in 2008. A total of six sites were evaluated, two in each allotment. A more limited sampling of Rangeland Health Assessments for these allotments were completed in May 2013, as budgets allowed, under 2013 sequestration.

3.7.1 Argyle Ridge Allotment

Argyle Ridge is comprised of 20,709 total acres, and approximately 27 % (5,612 Acres) of this acreage is located on slopes under 30% (Appendix K). Rangeland Health was completed on two sites in 2008, both on low-moderate (2-10%) slopes located adjacent to access roads. (See Map 1.)

Table 4 provides transect data for Trend Sites #1 and #2 in 2008. The plant community consisted of sagebrush, rabbit brush, western wheatgrass and blue bunch wheatgrass. Noxious weeds listed in the 2008 Rangeland Health consisted of houndstongue and thistle species.

Argyle Ridge #1	2008	Argyle Ridge #2	2008
Cover Class	Percent	Cover Class	Percent
Litter	0-1	Litter	2-5
Rock	2-5	Rock	0-1
Soil	6-15	Soil	6-15
Biological Crust	0-1	Biological Crust	0-1
Perennial Grass	31-50	Perennial Grass	6-15
Forb	6-15	Forb	2-5
Shrub	6-15	Shrub	51-75
Tree	6-15	Tree	6-15
Weeds	2-5	Weeds	16-30



Photo 2: Argyle Ridge 2013: Rangeland Health Site #1

When the site was re-visited in 2013, noxious weeds were not present, however, this particular year experienced a late growing season due to cool temperatures. Trend Site #1 was revisited in 2013, and photos were taken that demonstrate a similar plant community, with little change noticeable in the five year interim from the dominant cover classes and plant species present. The plant community was found to be consistent with the Ecological Site Description of *mountain big sagebrush* at the location. (Appendix D, 2008 Evaluations and Photos)

3.7.2 Lears Canyon Allotment

Lears Canyon is comprised of 10,703 total acres, and approximately 25% (2686 Acres) of this acreage is located on slopes under 30%. (Appendix K) Rangeland Health was completed on one site in 2008, on low-moderate (2-10%) slopes. Summary plant community paced-transect data for 2008 and 2013 are presented in Table 5. (Please note transect length is different from 2008 to 2013 data.) The paced transects collected limited relative-abundance data, and the sample size would not likely be considered sufficiently large enough to account for differences in percentages recorded between the two years. The transect lines are likely to vary based on the stride length of the observer and other variables. Therefore, they should be used as general guidelines for comparing current conditions.

Table 5: Lears Canyon Paced-Transect Summary, 2008 and 2013			
Lears Canyon (50 paces total)	2008	Lears Canyon (100 paces total)	2013
Cover Class	Percent	Cover Class	Percent
Litter	6-15	Litter	6-15
Rock	2-5	Rock	2-5

Lears Canyon (50 paces total)	2008	Lears Canyon (100 paces total)	2013
Cover Class	Percent	Cover Class	Percent
Soil	2-5	Soil	6-15
Biological Crust	6-15	Biological Crust	Not obtained
Perennial Grass	6-15	Perennial Grass	16-30
Forb	6-15	Forb	6-15
Shrub	51-75	Shrub	6-15
Tree	2-5	Tree	2-5
Weeds	2-5	Weeds	16-30

The 2008 Rangeland Health Indicator Evaluation Matrix described plant mortality/decadence, litter and invasive plants in moderate departure from the Desert Shrub Ecological Site Description (ESD). The 2013 Rangeland Health evaluation recorded invasive plants as the only moderate departure from the ESD. The 2013 Rangeland Health evaluation also listed gullies as moderate, but this was due to off-site influences. Soil stability tests arrived at an overall stability class rating at “2” in 2008, and increased to a “4” in 2013. Although the data is limited, this could be considered a positive change.

Relative percentages of perennial grasses have remained constant; however, it was noted that shrub observations declined and invasive weed observations increased. This increase and decrease can be explained somewhat owing to the 2013 transect extending into a non-shrub plant community.

3.7.3 Water Canyon #1 Allotment

Water Canyon is comprised of 4,268 total acres, and approximately 17% (899 Acres) of this acreage is located on slopes under 30%. (Appendix K) Rangeland Health was completed on two sites in 2008, both on low-moderate (2-10%) slopes. Rangeland Health Site #1 is located within the boundaries of the 2003 Garder Canyon Fire, located near the edge of the allotment. (Appendix E) Photos taken in 1983 confirm that houndstongue has been present in the area for some time (Appendix C).

Summary plant community paced-transect data for 2008 and 2013 are presented in Table 6.

Water Canyon #1	2008	Water Canyon #1	2013
Cover Class	Percent	Cover Class	Percent
Litter	2-5	Litter	16-30
Rock	0-1	Rock	6-15
Soil	1-15	Soil	16-30
Perennial Grass	2-5	Perennial Grass	6-15

Table 6: Water Canyon #1 Paced-Transect Summary, 2008 and 2013

Water Canyon #1	2008	Water Canyon #1	2013
Cover Class	Percent	Cover Class	Percent
Forb	16-30	Forb	16-30
Shrub	16-30	Shrub	16-30
Tree	6-15	Tree	2-5
Weeds	None	Weeds	0-1

The 2008 Rangeland Health data listed plant mortality/decadence as Moderate to Extreme. The cause of the high mortality rate was a direct correlate of the 2003 fire in the area, and is noted in the observer's comments from 2008. The slight departure from the Mountain Shrub/ Douglas Fir ESD in 2013 could still be attributed to the fire. The upward trend of perennial grasses can be characteristic of desirable Rangeland Health conditions on these Ecological Sites.

3.8 BLM Sensitive Plant Species

3.8.1 Argyle Canyon Phacelia

Argyle Canyon phacelia (*Phacelia goodrichii*) is a Utah BLM sensitive plant species, endemic to Argyle Canyon on the West Tavaputs Plateau, in southern Duchesne County. This member of the Borage family (Boraginaceae: subfamily Hydrophylloideae) is a biennial to short lived perennial that grows up to 160 centimeters. The species produces 3-5 mm long blue-violet flowers.

Argyle Canyon phacelia typically grow on sandy-silty soil in wash bottoms on the Green River formation in pinyon-juniper, serviceberry, and Douglas fir communities.

The type population for this species is located within the Argyle Ridge Allotment, in the bottom of Argyle Canyon.

3.8.2 Goodrich's Blazingstar

Goodrich blazingstar (*Mentzelia goodrichii*) is a Utah BLM sensitive plant species, endemic to the west Tavaputs Plateau in Northeast Utah. This member of the stickleaf family is a long-lived perennial growing from a taproot and woody caudex to a height of 30 centimeters. The species produces yellow flowers from late June to August.

Goodrich blazingstar typically grows on steep, white shale escarpments of the Green River Formation from 7,100 to 8,900 feet amsl.

Populations of this species are present in the Argyle Ridge and Lears Canyon Allotments.

3.8.3 Goodrich's Columbine

Goodrich's columbine (*Aquilegia scopulorum* var. *goodrichii*) is a Utah BLM sensitive plant species endemic to southern Duchesne County. This member of the buttercup family is an herbaceous plant producing light colored flowers during June and July.

Goodrich's columbine grows on shale ridges of the Green River formation in association with Bristle cone pine, limber pine, Salina wildrye, mountain mahogany, pinyon pine, and Douglas fir communities between 7,400 and 9,400 feet amsl.

One of the type populations for this species is present within the Argyle Ridge Allotment.

3.8.4 Uinta Greenthread

Uinta greenthread (*Thelesperma caespitosum*) is a Utah BLM sensitive plant species, native to the Bridger Basin and Uinta Basin of the Intermountain West. This perennial member of the Aster family has a tufted growth habit, and produces yellow or reddish heads in June and July.

Uinta greenthread prefers shaley or marly slopes and benches usually associated with the Green River Formation. Plants also grow on the Uinta Formation in Utah. This species ranges from 5,900 to 8,700 feet amsl.

Populations of this species are present within the Lears Canyon Allotment.

3.8.5 Untermann's Fleabane

Untermann fleabane (*Erigeron untermannii*) is a Utah BLM sensitive plant species, endemic to the West Tavaputs Plateau of northeast Utah. This member of the sunflower family is a compact cushion plant growing up to 10 centimeters from a deep taproot and freely branched caudex that produces white to pink or purplish flowers from May to June.

Untermann fleabane typically grows on calcareous shales and sandstones within the pinyon-juniper zone from 6,600 to 9,400 feet amsl.

Populations of this species are present within the Argyle Ridge Allotment.

3.9 Water: Ground Water Quality, Hydrologic Conditions, and Surface Water Quality

Argyle Creek and Minnie Maud Creek are small perennial streams that flow into Nine-Mile creek which deposits directly into the Green River. From the approximate center of Argyle Canyon Allotment, Argyle Creek travels about 18.4 stream miles to the confluence with Nine Mile Creek. Nine Mile Creek then travels about 44.7 stream miles to the Green River.

Both Argyle Creek and Minnie Maud Creed (both listed in UT14060005-003) in Utah's stream assessments are listed in the anti-degradation category of 3, which states: "Water quality degradation may be allowed outside of USFS boundary pursuant to anti-degradation review." The beneficial use classes are 2B, 3A and 4 which equate to infrequent primary contact recreation, cold water fishery/aquatic life and agriculture uses respectively. Both streams were listed as "impaired" in 2010 under class 3A, and the cause of impairment is listed as "Water Temperature." (See <http://wq.deq.utah.gov/>)

Soil materials and sediment is found in high enough volumes in Argyle Ridge, Minnie Maud, Nine Mile and other area streams to give the water a milky white color that are typical in this area of the Great Basin. Landslide area materials, during storm events, deposit directly into creeks and streams and the ephemeral drainages feeding them, as well as picking up additional roadbed materials from upslope county roads. These deposits spread into alluvial fans and outwashes directly adjacent to the creek. (Appendix G, Riparian Photos). These materials also scour and create steep slopes on the outside meander bends adjacent to creeks that can reach 4 to 12 feet in depth.

Stream flows are quite low (several inches of water in a one meter channel, on average) in the Argyle Creek, for example, but during run-off events these flow rates can swell exponentially to several hundred cubic feet per second over several hours, or days.

Although small amounts of soil material deposits would occur with livestock grazing in the allotments, the vast majority of stream channel morphology in the three allotments' streams is caused by natural weathering and large-scale precipitation events.

Ground water in the area is typically sealed in deep (several hundred feet) aquifers that have ample soil and geological depth for denitrification and organic conversion. The allotments are not located within Basin and Range Principle Aquifers within the State of Utah. (http://pubs.usgs.gov/ha/ha730/ch_c/jpeg/C031.jpeg) Where the water table does become more shallow, nitrification and bacteriological concerns would be similar to wildlife use. NO₃ formed in the upper part of the soil profile from manure would be subject to uptake by plants and some minor leaching to the water table in highly permeable soils. (Turyk, 2004) The soils in Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments would be considered to have low permeability. The vast majority of manure is not deposited in stream systems, and non-stream deposited fecal material in uplands rapidly converts to lignin and cellulose mats that are devoid of nitrogen, bacteria and other water pollutants of concern. The majority of fecal soil enrichment occurs right under the manure deposit at shallow depths, and insects, fungi and bacteria rapidly account for the remainder of fecal material, other than plant cell wall lignin and cellulose (more difficult to digest materials) in arid and semi-arid environments.

3.10 PFC Evaluation

The Argyle Canyon and Minnie Maud streams flow within the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. Selected stream reaches for PFC included 21 sites within the watersheds to assess Proper Functioning Condition (PFC) conditions of selected water sources. These were initially completed in 1999. (Maps 2, 3 and 4 depict site locations). Follow-up assessments of Functional at Risk and Non-Functional sites were completed on May 16, 2013 by an ID team.

3.11 Proper Functioning Condition Assessments

3.11.1 Argyle Canyon Allotment

Of the eleven sites identified in the Argyle Ridge Allotment, four were considered Properly Functioning, two were considered Functional at Risk, and five were considered Non-Functional in 1999. In 2013, follow-up assessments determined that overall functionality of the selected reaches is heavily influenced by local geology and erosive soils adjacent to and distributing alluvial materials under flash scouring precipitation events, far in excess of livestock or wildlife herbivory conditions along stream banks. (Appendix G: Riparian Photos).

A comparison of survey conditions for PFC indicated increases in vegetation along stream banks between 1999 and 2013 via photos and evaluation sheets. (Note: photo sets were both taken at the Argyle Creek PFC sites, however, photographic locations are not identical.)

A large upstream wildfire occurred on Argyle Ridge in 2012. (Churchcamp Fire, Appendix E: Allotment Maps). Oversurface flow, downcutting and erosion from increased run-off likely resulted in higher levels of sediment in local streams, and these effects are likely to continue to occur until vegetation establishment in the upstream portions of the drainages is re-established. These changes have not been quantitatively evaluated. (Appendix G: Riparian Photos). It should be considered, however, that these changes may be a contributing factor to the increased water temperatures noted in the 303d impairment category listing for the areas streams.



Photo 3: 2013 Argyle Creek with a typical riparian area channel



Photo 4: PFC Argyle Creek 1999 (typical bedrock channel)

3.11.2 Lears Canyon Allotment

Seven PFC sites are identified within the Lears Canyon Allotment, and all were considered to be in PFC condition in 1999. These sites were not re-evaluated in 2013 due to budget and sequestration constraints limiting personnel and field time.

3.11.3 Water Canyon #1 Allotment

Three PFC sampling sites are located in the Water Canyon #1 Allotment. Site #1 is located in the northeast portion of the allotment, and sites #2 and #3 are located in the southeast portion of the allotment were considered non-functional in 1999. (See WC#1, Map 3) The functionality on these sites, like the Argyle Ridge PFC sites, was noted to be related to scouring from on-site geology/soils and flash-flood conditions in steep ephemeral drainages. Repeat sampling in 2013 of the two Non-Functional sites determined these areas not to be stream reaches with typically associated riparian vegetation, but rather ephemeral drainages with dry channels interspersed with small surface water sites. (Appendix G: Riparian Photos)

3.12 Wildlife

3.12.1 Migratory Birds (including raptors)

All migratory birds and their nests are protected from take or disturbance under the Bald Eagle and Golden Eagle Protection Act (BEGEPA) of 1940 (16 U.S.C., 668-668d, 54 Stat. 250) and the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C., 703 et seq.). These protection laws were implemented for the protection of avian species. Unless permitted by regulations, it is unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any species covered under these Acts. In addition, Executive Order 13186 sets forth the responsibilities of federal agencies to further implement the provisions of these Acts by integrating bird conservation principles and practices into agency activities and by ensuring that federal actions evaluate the effects of actions and agency plans on protected avian species.

Though full raptor nesting surveys have not been completed within the allotments there is one confirmed golden eagle nest, two great-horned owl nests, and one long-eared owl nest located within the Argyle Ridge and Lears Canyon Allotments. The following addresses migratory birds that may utilize all three allotments for nesting or foraging activities, including those species classified as Priority Species by Utah Partners-in-Flight¹.

Pinion-Juniper, Conifer, Desert, Shrub, and Riparian Areas: American robin, blue-gray gnatcatcher, black-billed magpie, black-capped chickadee, black-chinned hummingbird, black-throated sparrow, Brewer's blackbird, Brewer's sparrow, broad-tailed hummingbird, Cassin's finch, Cassin's kingbird, Clark's nutcracker, common raven, gray flycatcher, gray vireo, greater sage-grouse, green-tailed towhee, juniper titmouse, Lewis's woodpecker, Mexican spotted owl, mountain bluebird, northern goshawk, pinion jay, prairie falcon, rock wren, sage sparrow, sage thrasher, short-eared owl, song sparrow, Virginia's warbler, western kingbird, white-throated swift, and Wilson's phalarope (Parrish et al. 2002).

3.12.2 Big Game

¹ Utah Partners-in-Flight is a cooperative partnership among federal, state, and local government agencies as well as public organizations and individuals organized to emphasize the conservation of birds not covered by existing conservation initiatives.

Mule deer and Rocky Mountain elk are the primary big game species found within the project area. Use typically occurs from spring to winter, when elk and deer utilize the project area for foraging, thermal cover and escape cover. Both species have an extremely variable diet and therefore live in a variety of habitats. They consume a combination of grasses, forbs, and shrubs. Food consumption is also related to the season of use. During winter, elk move to lower elevations where they are found most often on south facing slopes, primarily in pinyon-juniper woodlands. Deer typically move down to lower elevation foothill areas.

Crucial elk/deer summer and winter habitat has been designated within the project area. These designations were made in the Vernal Field Office RMP.

Other wildlife species that are likely to occur in the project area include black bear, mountain lion, coyote, and bobcat, as well as a large variety of small mammals. Many of these species are habitat generalists, meaning they are not tightly restricted to specific habitat types. These species have not shown negative impacts by livestock grazing; therefore, they will not be discussed further in this document.

3.12.3 Threatened, Endangered, Proposed or Candidate Species

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies to ensure that activities they authorize, fund, or carry out are not likely to adversely affect or jeopardize the continued existence of a federally-listed species or result in the adverse modification or destruction of its critical habitat. Though the U.S. Fish and Wildlife Service (USFWS) has not identified critical habitat within any of the three allotments regulations implementing this interagency cooperation provision of the ESA are codified at 50 CFR 402. In accordance with Manual 6840 BLM sensitive species are also managed to prevent future federal listing as threatened or endangered.

3.12.4 Mexican Spotted Owl

The Mexican spotted owl (MSO) is federally listed as a threatened species. The MSO ranges from southern Utah and Colorado through the mountains in Arizona, New Mexico, and west Texas into the mountains of central Mexico. MSO's in Utah are located in the Colorado Plateau Recovery Unit, as described in the MSO Recovery Plan (USFWS 1995a). In Utah, MSO's are a permanent resident that nests in the deep, sheer-walled, sandstone, or rocky canyons of the Green and Colorado River basins (USFWS 1995).

The BLM has identified potential nesting habitat rated as fair or better within two of the allotments: 1,938 acres within Argyle Ridge Allotment and 4,720 acres within Lears Canyon Allotment (SWCA 2005, as per BLM data). Presence and absence surveys have been completed within these allotments since 2007 and no MSO's have been identified. Given the lack of MSO observed, the USFWS have not identified any critical habitat within the Vernal Field Office.

3.12.5 Greater Sage-grouse

Greater sage-grouse is a BLM sensitive species, and a federal candidate for listing under the ESA. These birds inhabit sagebrush plains, foothills, and mountain valleys. Sagebrush is the predominant plant of quality habitat. Factors involved in the decline in both the distribution and abundance of greater sage-grouse include permanent loss, degradation, and fragmentation of sagebrush-steppe habitat throughout the western states including Utah (Heath et al.1996, Braun 1998). Documented severe populations declines (approximately 80%) occurred from the mid-1960s to mid-1980s. Research and conservation efforts in the last 20 years have help stabilize

and recover many populations. Populations appear to have taken a slight positive turn in recent years. Utah Division of Wildlife Resources (UDWR) identifies occupied sage-grouse habitat (approximately 950 acres) along two of the allotment boundaries. The allotments are not considered a Sage-Grouse Management Area (SGMA) in the State's Conservation Plan for Greater Sage-grouse. Currently, BLM considers all occupied sage-grouse habitat as Preferred Priority Habitat (PPH, BLM IM-2012-043). The proposed action is consistent with the guidelines established in Utah IM-2012-043 (per personal communication with UDWR Brian Maxfield and Brad Crompton, 2013) verified that the project would have no impacts to greater sage-grouse, therefore, greater sage-grouse will not be analyzed any further in this document.

4.0 ENVIRONMENTAL IMPACTS

4.1 Introduction

This chapter discusses the potential consequences or effects of implementing of the alternatives as described in Chapters 2 and 3. The intent is to provide scientific and analytical basis for comparison of the effects of each alternative.

4.2 Direct/Indirect Impacts

The affected environment and environmental consequences of the No Action, Proposed Action and No Grazing alternatives were considered and analyzed by an interdisciplinary team as documented in the IDT Checklist located in Appendix A. This section analyzes the impacts of the alternatives to those resources described in Chapter 3.

4.3 Areas of Critical Environmental Concern

An activity plan and associated NEPA have not been completed for Lears Canyon ACEC. No site-specific Decisions have been put into place, and the area remains unfenced within the grazing allotment.

The designation area has been used and is accessible to livestock for grazing. Under the No Action alternative, the Lears Canyon ACEC would be accessible to livestock from March through May during the early part of the growing season. Although the allotment has been meeting Rangeland Health Standards in representative areas, early use may or may not be limiting opportunity for softwood tree regeneration and early establishment.

Under the Proposed Alternative, livestock use in the ACEC designation area would not occur in during the early stages of the growing season and plant communities, especially understory species and new tree growth could become more established.

Under the No Grazing alternative, herbivory from livestock grazing would not occur in the ACEC area or the Lears Canyon Allotment. Expected changes, in terms of older tree and shrub plant community representations would not be expected to dramatically shift beyond ecological expectations unaffiliated with livestock grazing such as fire, climate change, and drought events. Understory vegetation changes could occur that could include increased litter, increased reseeding, and grass-forb ratio changes, however, the degree and scale of these are these are largely unknown under long-term no grazing conditions in the area.

4.3.1 Mitigation:

1. If an ACEC management plan, and the accompanying site-specific NEPA is completed for the Lears Canyon ACEC, it could be implemented during the new ten-year Term Grazing Permit and the area could be fenced. Exclosure fencing would likely require an adjustment in the estimated forage available to livestock, with a corresponding AUM adjustment made for the permit. This analysis and change should be evaluated in the ACEC NEPA prior to implementation.

4.4 Invasive Plants, Noxious Weeds, Soils, and Vegetation

Wide-scale eradication and containment of houndstongue is unlikely unless technological advances in biological control or specific herbicides become available.

Houndstongue is displacing some native vegetation in most upland sites in the area, however, the extent and change in the plant composition changes have not been readily apparent in Rangeland Health transects and evaluations as the infestation occurred prior to transect establishment in 1999.

Follow-up evaluation for houndstongue, its relative abundance and its effects on the plant communities in these specific soil types, elevations and geographical areas should be further explored to evaluate the species influence under a wide range of conditions and multiple resource uses and events. USDA and BLM biological and noxious weed technology personnel should continue to be alerted to this area as a potential area for houndstongue research.

In areas susceptible to invasion, proper livestock grazing would ideally include altering timing, frequency and level of defoliation to allow a full recovery of desirable grass species. In these allotments, however, water availability to livestock is abundant and it is likely that timing, frequency and levels of defoliation are already somewhat present as livestock spread out along canyon bottoms and uplands.

Under the No Action and Proposed Action alternatives, livestock as a vector for seed spread would remain. Under the no grazing alternative, the spread of houndstongue seed by livestock would be eliminated, however wildlife, recreational users and vehicles and other seed vectors would remain. With the current abundance of the species throughout the uplands plant communities in all three grazing allotments, a seed source is readily available and the effects of removing livestock grazing as a quantifiable potential increaser of the infestation in this area is currently unknown.

Ongoing upland and riparian noxious weed treatments in the three allotments will continue for mapped sites such as the Canada thistle, tall white top, Russian knapweed and tamarisk infestations in Water Canyon #1, and new infestations of the all noxious weed species, as budgets and seasonal workforce allows.

4.4.1 Mitigation:

1. Establish at least one long-term paced transect in each allotment (Argyle Ridge, Lears Canyon, and Water Canyon #1) designed to specifically monitor the relative abundance of houndstongue in a median, area-representative, non-fire, livestock-utilized plant community to assist in Rangeland Health evaluation. These can be co-located with current Rangeland Health sites.
2. Continue awareness and updates to the noxious weed research community on houndstongue status in the greater Argyle Ridge area.
3. Treat new infestations in any areas of the allotments that are not currently infested with houndstongue, aggressively and rapidly, under the VFO upland Integrated Weed Treatment Program.

4.5 Vegetation and Soils

Of the six eco-sites mapped in Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments, conifer, pinyon/juniper, mountain big sagebrush, greasewood and the mapped aspen clone would be considered suitable for grazing.

Understory forage and vegetation is dominated by mountain brome, various bluegrass species, and blue-bunch wheatgrass bunchgrasses which vary in production based on annual precipitation

timing and quantity. Rangeland Health data was been obtained in 2008 and 2013 for Lears Canyon, and Water Canyon #1, and a follow-up photo was obtained in Argyle Ridge for 2013. These indicated plant communities meeting expected ecological site descriptions with minor departures.

Because the three allotments in this analysis do not have National Resource Conservation Service (NRCS) mapping completed at the soil map unit level resolution, ESD's were used from previously mapped VFO GIS data layers. When new ESD's based on soil mapping do come on line, new and better information will be used to determine inclusion and departure from expected ecological conditions

Although soils in the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments are shallow and typically low in nitrogen and total carbon, bunchgrass and understory forage palatable to livestock and wildlife can be abundant (> 1000 pounds/acre dry weight) in mountain sagebrush areas during an average moisture year (NRCS 2010 Ecological Site Descriptions for Utah, used here for comparison against VFO ESD mapping data.)

As continued mapping and monitoring continues for both range, fire, soils, and streams, ongoing maintenance and upward trend of vegetation and soil conditions under the Proposed alternative is expected. Under the No Action alternative these same conditions would continue, however, less improvement would be expected in the Lears Canyon Allotment due to the earlier season of use. The No Grazing alternative would alter vegetation and soils, however, upland plant communities may not significantly depart from current conditions based on current stocking rates and utilization which remains low. Riparian area conditions under the No Grazing Alternative and the Proposed Action alternative with new Terms and Conditions stubble height and browse requirements would be expected to improve.

Soil biological crust activity applies to uplands, and is present in the allotments as well as sagebrush, greasewood, pinyon/juniper communities and conifer woodlands. These biocrusts respond to precipitation, stocking and utilization rates and cattle spread in the allotments similarly to vegetation. The No Grazing alternative could lead to somewhat more biological soil crust activity, however, the level of change has not been quantified and remains unknown at this time. The Proposed Action and No Action alternatives would expect biocrust activity to remain similar to current conditions. Biocrust mapping has not occurred on the VFO.

4.6 Livestock Grazing and Rangeland Health

4.6.1 Alternative A – No Action

Under the No Action alternative, Term Grazing permits would be cancelled and re-issued with new dates to six permittees utilizing the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. Livestock grazing would occur during the current seasons of use and within the permitted use levels (AUMs) identified in Table 1.

This alternative currently allows permittees varied turn-out dates in the Argyle Allotment. The BLM and permittees may negotiate different (later) turn out dates due to annual climatic events and range condition readiness, but grazing use must remain within the permitted season of use.

The Lears Canyon season of use begins March 1 for horses and May 15th for cattle. This season of use may be counterproductive for optimizing rangeland vegetative conditions because early growth of cool-season grasses is more susceptible to herbivory-related declines in plant vigor

timing and quantity. Rangeland Health data was been obtained in 2008 and 2013 for Lears Canyon, and Water Canyon #1, and a follow-up photo was obtained in Argyle Ridge for 2013. These indicated plant communities meeting expected ecological site descriptions with minor departures.

Because the three allotments in this analysis do not have National Resource Conservation Service (NRCS) mapping completed at the soil map unit level resolution, ESD's were used from previously mapped VFO GIS data layers. When new ESD's based on soil mapping do come on line, new and better information will be used to determine inclusion and departure from expected ecological conditions

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As continued mapping and monitoring continues for range, fire, soils, and streams, ongoing maintenance and upward trend of vegetation and soil conditions under the Proposed alternative is expected. Under the No Action alternative these same conditions would continue, however, less improvement would be expected in the Lears Canyon Allotment due to the earlier season of use. The No Grazing alternative would alter vegetation and soils, however, upland plant communities may not significantly depart from current conditions based on current stocking rates and utilization which remains low. Riparian area conditions under the No Grazing Alternative and the Proposed Action alternative with new Terms and Conditions stubble height and browse requirements would be expected to improve.

Soil biological crust activity applies to uplands, and is present in the allotments as well as sagebrush, greasewood, pinyon/juniper communities and conifer woodlands. These biocrusts respond to precipitation, stocking and utilization rates and cattle spread in the allotments similarly to vegetation. The No Grazing alternative could lead to somewhat more biological soil crust activity, however, the level of change has not been quantified and remains unknown at this time. The Proposed Action and No Action alternatives would expect biocrust activity to remain similar to current conditions. Biocrust mapping has not occurred on the VFO.

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This alternative currently allows permittees varied turn-out dates in the Argyle Allotment. The BLM and permittees may negotiate different (later) turn out dates due to annual climatic events and range condition readiness, but grazing use must remain within the permitted season of use.

The Lears Canyon season of use begins March 1 for horses and May 15th for cattle. This season of use may be counterproductive for optimizing rangeland vegetative conditions because early growth of cool-season grasses is more susceptible to herbivory-related declines in plant vigor

and seed set. Overall, although the current grazing system is acceptable; this alternative does not provide for optimum forage conditions in Lears Canyon.

No rilling or excessive trailing (although game trails do exist) is evident on all three allotment's steep side slopes, and use of limited palatable forage as slopes increase, is not excessive. Livestock use is generally confined to canyon bottoms or upland plateau areas. Livestock generally disperse well within the allotments by utilizing both ephemeral and live water sources.

Current seasons-of-use and stocking rates are meeting Rangeland Health Standards and PFC in all three allotments.

A Determination has been made that the three allotments analyzed in this EA meet "*The Utah Standards of Rangeland Health*" as related to livestock grazing and permit renewal under the current livestock use of the allotments. This Determination would apply to all alternatives. (Appendix L)

4.6.2 Alternative B – Proposed Action

Under the Proposed Action, Term Grazing permits would be cancelled and re-issued with season of use modifications and additional utilization Terms and Conditions to six permittees utilizing the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments.

The permittees have proposed minor season of use changes to the Argyle Ridge Allotment to standardize turn-out and off-dates between the four permittees. BLM has proposed changes in the Lears Canyon Allotment to precluded March through May early season grazing use. The proposed seasons of use, AUM totals, and livestock numeric changes are compared in Table 2.

The season-of-use adjustments on the Argyle Ridge Allotment are expected to have minor vegetation responses, although the two of the permits could now turn out livestock into the allotment approximately two weeks earlier in the growing season. Although this will result in a limited amount of increased livestock herbivory slightly earlier in the growing season, monitoring will continue to assess changes in Rangeland Health conditions. Should Rangeland Health monitoring indicate decline in the Argyle Ridge Allotment, a later season of use should be considered. (Appendix I, Allotment Monitoring Schedule)

The proposed season of use changes in the Lears Canyon Allotment should provide increased establishment and vigor to plant communities by delaying turn-out by 30 to 90 days at the beginning of the growing season. Although the growing season is altered somewhat by annual precipitation events, these changes should provide upward trends in ecological conditions over the long term.

Overall livestock use patterns on the landscape and cattle dispersal is expected to remain similar to current use and the No Action alternative, regardless of season-of-use changes. Limited forage on steep side slopes, lack of rilling and excessive trailing, and livestock use areas is similar and would be expected to continue under the Proposed Action alternative.

4.6.2.1 Mitigation:

1. Should RH monitoring indicate declining conditions in the Argyle Ridge Allotment, adjustment to all four Term Grazing Permits should be addressed in a follow-up NEPA document that would consider a turn out date later in the growing season.

The new permits would be issued with Standard Terms and Conditions, as well as the following additional Terms and Conditions, as outlined in the Proposed Action.

1. Manage the allotment for the following utilization levels of key species to meet the desired objectives for vegetation composition.
 - Combined livestock and wildlife use of key upland species would not exceed 50% on grasses and forbs.
 - Provide for bank protection and sediment entrapment, riparian areas would be managed for the following utilization levels:
 - c. Key herbaceous riparian vegetation, where stream bank stability is dependent upon it, would have a minimum stubble height of 4 inches on the stream bank along the green line at the end of the growing season.
 - d. Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals.

4.6.3 Alternative C – No Grazing

Under this alternative, livestock grazing would not occur on the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments for a grazing cycle of ten years. As with the other alternatives analyzed in this EA, at the end of the ten year grazing permit cycle, the decision would be re-evaluated.

Monitoring under the No Grazing alternative would occur as time and annual budgets permit. (Appendix I, Allotment Monitoring Schedule). The allotments analyzed in this EA are all meeting “*The Utah Standards for Rangeland Health*”. Under this alternative, the allotments could continue to meet these standards and guidelines, however, long term vegetation responses are largely unknown. More forage could be available for wildlife; however, non-removal of standing dead growth could decrease rangeland productivity, and alter plant community regeneration dynamics in some areas. This could lead to increased forage production initially but ultimately result in an increased in decadent biomass, shading and plant community compositional changes in productive sites.

This alternative would negatively impact livestock permittees, as the operators rely on these allotments for summer and fall grazing. Without Term Grazing permit use of the allotments, the permittees would likely be required to pursue one or a combination of the following options: purchase and feed hay to their livestock herds on private land; lease private lands at a higher cost; find other permits on public lands, if available. Permittees may or may not be able to economically adjust to this impact and may have to liquidate assets under a No Grazing alternative.

It should be noted and is common to all alternatives, that the BLM, at its discretion, may withhold and/or modify grazing permits at the agency’s discretion. If the authorized officer determines that rangelands are not in compliance or trending toward compliance with Fundamentals of Rangeland Health, Guidelines for Grazing Management, or Standards for Rangeland Health.

4.7 Rangeland Health

4.7.1 Argyle Ridge Allotment

Argyle Ridge Trend Site #1 is located between two alluvial outwash fans. Although the 2013 photography shows a greater abundance of bare soil, the photo was taken following a cool spring when average temperatures were much below average, and the growing season was delayed. In Argyle Ridge Trend Site #2 the dominant canopy cover falls into the shrub category. Although there are *Low to Moderate* departures from the associated ESDs, both sites were considered to be meeting Rangeland Health Standards following 2013 evaluation.

4.7.2 Lears Canyon Allotment

Lears Canyon Trend Site #1 is located near a large drainage, however, influence from the drainage is considered off-site. The most notable change in Lears Canyon from 2008 to 2013 was the increase in soil stability class rating. Although data is limited, soil organic matter would have increased to account for the rating class increase from 2 to 4. However, the 2013 transect did extend into a non-shrub community with a greater grass component, which may have increased overall organic matter present. Although there are *Low to Moderate* departures from the associated ESDs, this site was considered to be meeting Rangeland Health Standards in both 2008 and 2013.

4.7.3 Water Canyon #1 Allotment

Water Canyon #1 Trend Site #1 is located near a fenceline border of the Argyle Ridge Allotment and within the 2003 Garder Canyon Fire. It would be questionable if the 2008 Rangeland Health observations could meet the Utah Standards due to the *Moderate to Extreme* departure in plant mortality/decadence. However, the 2013 Rangeland Health data indicate that the area has shown an increase in litter and perennial grasses. Although the data is limited and data comparison contains the difficulties described in Chapter 3, site conditions can also be confirmed *Low to Moderate* departures from the associated ESDs, and this site was considered to be meeting Rangeland Health Standards in 2013.

Determination has been made that the three allotments analyzed in this EA meet “*The Utah Standards of Rangeland Health*” as related to livestock grazing and permit renewal. (Appendix L)

4.8 Monitoring and/or Compliance

Under the No Action and Proposed Action alternatives, monitoring would continue for Rangeland Health, PFC site analysis and updates, forage utilization/stubble height and browse use, livestock season-of-use compliance and administrative monitoring as time and budgets allow. The purpose of this monitoring would be to ensure that the upland ecological sites, riparian, and allotment resource objectives are met. Under the No Grazing alternative the same monitoring would occur with the exception of livestock compliance and administrative monitoring, as budgets allowed.

4.9 BLM Sensitive Plant Species

4.9.1 Green River Shale Outcrop Endemics

Of the five Utah BLM Sensitive plant species identified within the three allotments four are found growing on generally steep, sparsely vegetated shale outcrops of the Green River formation. These species are Goodrich’s columbine, Untermann’s fleabane, Goodrich’s blazingstar, and Uinta greenthread. These four species have different overall spatial and elevation ranges, however, it is expected that given the similarity in habitat with regard to

accessibility and forage attractiveness, the impacts from grazing will be similar between the species and will be described together for each alternative.

4.9.1.1 Alternative A – No Action

Under the No Action Alternative, cattle and horse grazing would be authorized to graze within the three allotments, which contain suitable and occupied habitat for Goodrich's columbine, Untermann's fleabane, Goodrich's blazingstar, and Uinta greenthread. This species primarily grows in the Green River shale bluffs and ridge crests. These habitats tend to be topographically very rough and support very sparse vegetation. Therefore, under normal to favorable forage conditions these habitats do not serve as attractive foraging locations for livestock. Therefore, it is anticipated that populations of this species will not receive strong grazing pressure from livestock. During periods of poor forage production, there may be increased grazing pressures on the species. However, by managing the allotments such that it continues to meet Rangeland Health Standards, the risk of additional impacts during these time periods will be minimized. Given these impacts, the No Action Alternative "may impact Goodrich's columbine, Untermann's fleabane, Goodrich's blazingstar, and Uinta greenthread but is not likely to lead to the need to list the species under the Endangered Species Act."

4.9.1.2 Alternative B – Proposed Action

Under the Proposed Action Alternative, impacts to Goodrich's columbine, Untermann's fleabane, Goodrich's blazingstar, and Uinta greenthread will be the same as those described under the Proposed Action Alternative. Given these impacts, the No Action Alternative "may impact Goodrich's columbine, Untermann's fleabane, Goodrich's blazingstar, and Uinta greenthread but is not likely to lead to the need to list the species under the Endangered Species Act."

4.9.1.3 Alternative C – No Grazing

Under this alternative there would be no grazing allowed for a monitoring cycle of 10 years. During this time period there would be no potential impacts from livestock grazing activities on Goodrich's columbine, Untermann's fleabane, Goodrich's blazingstar, and Uinta greenthread.

4.9.2 Argyle Canyon Phacelia

4.9.2.1 Alternative A – No Action

Under the No Action Alternative, cattle and horse grazing would be authorized to graze within the Argyle Ridge Allotment, which contains suitable and occupied habitat for Argyle Canyon phacelia (*Phacelia argylensis*). Studies have not been conducted to ascertain the impacts of grazing specifically for Argyle Canyon phacelia. However, likely impacts can be based upon information gathered for other rare species that are also closely aligned with *Phacelia glandulosa*, specifically *P. formosula* in northwest Colorado and *P. glandulosa* var. *deserta* in Southwest Wyoming. In neither species was direct grazing of the species was identified as threat to the species potentially due to the presence of sticky glandular pubescence and their strong aromas (Fertig, 1999, USFWS, 2011). Trampling associated with cattle grazing was identified as a negative impact to *P. formosula* at portion of the sites. However, those locations were associated were in the vicinity of holding pens and development on private lands and therefore "heavy grazing" (USFWS, 2011). However, locations of this species receiving light grazing activity do "not appear to be correlated with population fluctuations" (USFWS, 2011). For *P. glandulosa* var. *deserta*, trampling was not observed to be a negative threat to the species.

Given this information and the fact that managing the allotments to meet Rangeland Health will prevent the grazing intensity experienced at the *P. formosula* sites found to have trampling damage, impacts due to grazing are expected to be minimized for Argyle Canyon phacelia.

Given these impacts, the No Action Alternative “may impact Argyle Canyon phacelia but is not likely to lead to the need to list the species under the Endangered Species Act.”

4.9.2.2 Alternative B – Proposed Action

Under the Proposed Action Alternative, impacts to Goodrich’s columbine will be the same as those described under the No Action Alternative. Given these impacts, the Proposed Action Alternative “may impact Argyle Canyon phacelia but is not likely to lead to the need to list the species under the Endangered Species Act.”

4.9.2.3 Alternative C – No Grazing

Under this alternative there would be no grazing allowed for a monitoring cycle of 10 years. During this time period there would be no potential impacts from livestock grazing activities.

4.10 Water: Ground Water Quality, Hydrologic Conditions, and Surface Water Quality

Argyle Creek and Minnie Maud are small perennial streams that flow into Nine-Mile creek which deposits directly into the Green River, however, the distance is over 45 miles from the Green River Confluence.

Both Argyle Creek and Minnie Maud Creek (both listed in UT14060005-003) in Utah’s stream assessments are listed in the anti-degradation category of 3, which states that “Water quality degradation may be allowed outside of USFS boundary pursuant to anti-degradation review.” The beneficial use classes are 2B, 3A, and 4 which equate to infrequent primary contact recreation, cold water fishery/aquatic life and agriculture uses respectively. Both streams were listed as “impaired” in 2010 under class 3A, and the cause of impairment is listed as “water temperature.” (See <http://wq.deq.utah.gov/>.) This impairment could be expected from the turbidity and naturally erosive soils, fire activity, upstream grazing on private lands, grazing, road impacts, and other contributions.

Landslide area materials, during storm events, deposit directly into creeks and streams and the ephemeral drainages feeding them, as well as picking up additional roadbed materials from upslope county roads. These deposits spread into alluvial fans and outwashes directly adjacent to the creek. (Appendix G, Riparian Photos). These materials also scour and create steep slopes on the outside meander bends adjacent to creeks that can reach 4 to 12 feet in depth. It is likely that this is one of the main sources of sediment in the allotments local streams.

Ground water in the area is typically sealed in deep (several hundred feet) aquifers that have ample soil and geological depth for denitrification and organic conversion. The allotments are not located within Basin and Range Principle Aquifers within the State of Utah. (http://pubs.usgs.gov/ha/ha730/ch_c/jpeg/C031.jpeg) Where the water table does become more shallow, nitrification and bacteriological concerns would be similar to wildlife use. NO₃ formed in the upper part of the soil profile from manure would be subject to uptake by plants and some minor leaching to the water table in highly permeable soils. (Turyk, 2004) The soils in Argyle Ridge, Lears Canyon, and Water Canyon Allotments would be considered to have low permeability. Therefore, groundwater concerns are low for the allotments.

The vast majority of manure is not deposited in stream systems, and non-stream deposited fecal material in uplands rapidly converts to lignin and cellulose mats that are devoid of nitrogen, bacteria and other water pollutants of concern. Therefore surface water concerns would be considered low from grazing use for biological contaminants and would be similar to wildlife use.

4.11 Proper Functioning Condition Assessments

PFC sites selected within these allotments indicate an upward trend with in these sites under current grazing conditions in recent years. Livestock grazing indicators have determined that most disturbance to PFC sites are due to natural occurrences (ie., fire, flash flooding). Overgrazing of PFC sites has been minimalized due to the use of summer and fall grazing seasons.

It would not be expected that sediment loading and stream sinuosity or depth would be significantly changed by livestock as bank vegetation is intact and slope cutting is occurring on the outside edge of meanders as is common in semi-desert creek systems. These cuts are steep and flash-event caused, and are largely inaccessible and/or used by livestock. Water access along the streams for livestock in these canyons is fairly open and accessible in many reaches, and concentrated use on BLM lands was found to be less commonly observed than those found on some adjacent, smaller and privately owned and grazed subdivisions, vehicle-crossings, and water development structures adjacent to stream-side residences.

4.12 Wildlife

4.12.1 Alternative A – No Action

4.12.1.1 Migratory birds (including raptors)

Various migratory birds and raptors may utilize the allotments during nesting or foraging periods as identified in Chapter 3. Under this alternative, livestock would be allowed to utilize the allotments during the period of time in which migratory birds, including raptors, could be nesting, roosting, or foraging. Potential effects to birds from this alternative include disturbance from human activity (including harassment and temporary displacement) during livestock grazing. Livestock movements or permittee activities could temporarily displace nesting birds; however, these species are unlikely to abandon their nests or disturb nuptial behavior as this disturbance would be of short term and would likely be considered unintentional flushing. This potential impact is not expected to create a decline in bird species populations or lead to federal listing of a species.

Currently these allotments are meeting "*The Utah Standards for Rangeland Health*" and it is anticipated that livestock and migratory birds would continue to use these allotments without negative impacts. Grazing impacts to migratory birds, including raptors, within the Argyle Ridge and Water Canyon #1 Allotments would be the same as the Proposed Action Alternative. However, this alternative allows more accumulation of temporary disturbance within the Lears Canyon Allotment as cattle and horses would graze during the critical growing season.

4.12.1.2 Fish and Wildlife Excluding USFWS Designated Species

4.12.1.2.1 Big Game

Under this alternative, livestock will continue to utilize the allotments during the summer months. Elk and deer will continue to utilize the allotments during the same time frame as the

livestock. Currently the allotment is meeting “*The Utah Standards for Rangeland Health*”. Impacts to big game would be the same as the proposed action.

4.12.1.3 Threatened, Endangered, Proposed or Candidate Species

4.12.1.3.1 Mexican Spotted Owl (Federally Threatened)

Mexican spotted owl (MSO) was analyzed for impacts from livestock grazing under the *Amendment to the March 12, 2010 Vernal Grazing Permit Renewal Biological Opinion (File number 6-UT-09-F-019)* received from USFWS in conclusion of Section 7 Consultation of the ESA. The Biological Opinion states specific impacts to Mexican spotted owl and their potential habitats within the Vernal Field Office in relation to livestock grazing as follows:

Grazing has the potential to influence habitat composition and structure, and affect food availability and diversity for the MSO. Controlled studies on the effects of livestock and wildlife grazing on MSO habitat have not been conducted, so specific effects have not been verified (USFWS 1995).

Direct impacts to MSO nest sites are not likely to occur from grazing due to the rugged and generally inaccessible canyon terrain where the nest sites are found.

Grazing can alter a plant community directly or indirectly. Direct alterations include plant removal by consumption or trampling by livestock. Indirect alternations may include loss of seed source or damage to soil (Dryer et al. 1984, Kauffman and Krieger 1984, Fleischner 1994, USFWS 1995). Moderate to heavy grazing can reduce plant density, cover, biomass, vigor, and regenerative ability, and can alter the composition and structure of grasses, forbs, shrubs, and tree components in an area (Hanley and Page 1982, Zimmerman and Neuenschwander 1984, Schultz and Leininger 1990, and Milchunas and Lauenroth 1993, USFWS 1995). These impacts can affect MSO by reducing, eliminating, or suppressing regeneration of the species habitat. Reduced regeneration could limit the development of over-story structure needed for nesting, roosting, supporting and adequate prey base, and other life history requirements of the MSO (USFWS 1995).

Riparian areas are particularly vulnerable to extended livestock concentration. Significant alterations in vegetation composition and structure can result from livestock management intensity within these areas (Knopf et al 1988, Kaufmann and Kreuger 1984). MSO's are not considered to be an obligate riparian species. However, riparian habitats are important as a prey base for MSO and are also used for roosting. MSO are also incapable of self-thermoregulation and depend upon riparian habitats as well as canyon shade to control inner temperatures.

Increased human activity from authorized construction and herding efforts in viable habitats may disrupt nesting and foraging behaviors and could result in the species leaving the area or abandoning nests.

The placement of salt and mineral supplements may lead to livestock concentration in MSO habitats and could again result in the displacement of the species.

Based on the above analysis and the lack of MSO's identified within the allotments, implementation of livestock grazing terms and conditions and the rangeland management program a **"may affect, is not likely to adversely affect"** situation exists for MSO.

4.12.1.3.2 Conservation Measures

The following conservation measures are meant to minimize and/or avoid negative impacts to MSO.

- Utilization levels proposed under the proposed alternative would ensure that enough residual cover would remain on the allotments to support sufficient prey abundance for the MSO.
- Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached, or due to unusual climatic conditions, fire, flood, or other act of nature. The BLM would assess resource conditions through field inspections and determine, in consultation with the permittee, whether management changes (e.g., changes in livestock numbers, adjustment of move dates, or other changes of use within the parameters identified under this alternative) may be implemented. If maximum utilization is reached on key species/areas in the allotment before a scheduled move, the use of salt, herding, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be moved from the use area or allotment. This would improve the condition of upland, riparian, and MSO habitat by assuring that the utilization levels are not exceeded. This would also reduce any damage to habitat by restricting use during critical drought periods.
- Utilization of key species would not exceed 50% on herbaceous species and 40%** on shrub species based on current year's growth (by weight) during the grazing season. This would allow the growth/regrowth of vegetative species to achieve their potential growth form. These utilization levels would facilitate maintaining or improving the condition of upland and riparian areas, including habitat for MSO prey species.

**Please note: New Terms and Conditions under the Proposed Action for livestock are more stringent; "Key riparian browse vegetation would not be used more than 30% of the current annual twig growth that is within the reach of the grazing animals."
- The overall management objectives for the allotments prepared for each permittee and their associated allotments would be late seral (good) ecological condition or better for all ecological sites (with a mix of age classes to provide a vegetative mosaic), and static to upward trend. While this would be the primary objective, there may be circumstances (such as threatened or endangered species requirements) where areas would be managed for an earlier seral stage. This could benefit the MSO by maintaining and/or improving potentially suitable canyon habitat.
- All riparian areas would be managed for proper functioning condition with static to upward trend. The attainment of these objectives would be analyzed and evaluated within the limitations of the ecological site's potential. The attainment of this objective would benefit the MSO by helping maintain the condition of habitat for prey species and improving the condition of potentially suitable habitat.

All of these measures would be implemented as a part of the selected alternative.

4.12.2 Alternative B – Proposed Action:

4.12.2.1 Migratory birds (including raptors)

Under the Proposed Action Alternative, impacts to migratory birds, including raptors, would be the same as identified in the No Action Alternative. However, this alternative compared to No Action Alternative is anticipated to prolong both diversity and biomass of desirable forbs, cool season grasses, and shrubs the opportunity to operate in a functional condition for the continuance of meeting rangeland standards within the Lears Canyon Allotment as there would be no grazing during the critical growing periods.

The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.

4.12.2.2 Fish and Wildlife Excluding USFWS Designated Species

4.12.2.2.1 Big Game

Under this alternative summer livestock would still be present during the summer months. Crucial elk/deer summer and winter habitat has been designated within the allotments. Big game species will utilize the allotments throughout the year, but primarily in the summer. During the site visit, deer and elk pellets were documented throughout the allotments. Livestock would be present from June 1 – October 31 within the allotments. Big game species and livestock can compete for forage on shared ranges. Livestock activities could temporarily displace big game species, and disrupt fawning/calving behaviors. The impacts would be short term. Currently, the allotments are meeting Standards and Guides, and no conflicts between livestock and big game species has been identified by the DWR or BLM.

The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.

4.12.2.3 Threatened, Endangered, Proposed or Candidate

4.12.2.3.1 Mexican Spotted Owl (Federally Threatened)

Under the Proposed Action Alternative, impacts to MSO would be the same as identified in the No Action Alternative. However, this alternative compared to No Action Alternative is anticipated to prolong both diversity and biomass of desirable forbs, cool season grasses, and shrubs the opportunity to operate in a functional condition for the continuance of meeting rangeland standards within the Lears Canyon Allotment as there would be no grazing during the critical growing periods.

The BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached.

4.12.3 Alternative C – No Grazing

4.12.3.1 Wildlife: Migratory birds (including raptors)

Under this alternative there would be no grazing allowed for a monitoring cycle of 10 years. There would be no competition between migratory birds, including raptors, and livestock. There also would be no short term impacts to during nuptial or nesting periods from livestock activities. The No Grazing Alternative would not be in compliance with the BLM's current Land Use Plan.

4.12.3.2 Fish and Wildlife Excluding USFWS Designated Species

4.12.3.2.1 Big Game

Under this alternative there would be no grazing allowed for a monitoring cycle of 10 years. There would be no competition between big game species and livestock for forage. There also would be no short term impacts to fawning/calving behaviors from livestock activities.

4.12.3.3 Threatened, Endangered, Proposed or Candidate

4.12.3.3.1 Mexican Spotted Owl (Federally Threatened)

Under this alternative there would be no grazing allowed for a monitoring cycle of 10 years. There would be no competition between migratory birds, including raptors, and livestock. There also would be no short term impacts to during nuptial or nesting periods from livestock activities. The No Grazing Alternative would not be in compliance with the BLM's current Land Use Plan.

4.13 Cumulative Impacts Analysis

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions.

For the non-federal lands encompassed by the grazing allotments, livestock grazing would continue. Off highway vehicle use would continue on many of these lands as well. Non-motorized recreation activities such as camping and hiking would also continue. Portions of federal and non-federal lands within or adjacent to the allotments may also experience energy and mineral development. The specific resources that were analyzed for Potential Impact in this EA are analyzed for cumulative impacts are found below.

4.13.1 Reasonably Foreseeable Action Scenario (RFAS)

The following reasonably foreseeable action scenario (RFAS) identifies the cumulative actions that would cumulatively affect the same resources in the cumulative impact area as the Proposed Action and alternatives.

Access to BLM lands within the allotments' boundaries is limited somewhat by private land in the lowlands and steep slopes in some areas. Recreation use occurs and includes horseback riding, mountain biking, hiking, hunting, OHV use, and recreational shooting. As the Carbon, Duchesne, and Uintah County populations continue to increase, demands for recreation on public lands will likely increase.

The oil and gas industry continues to expand in Carbon, Duchesne, and Uintah Counties. This development and associated infrastructure is likely to continue and may have an effect in the future through landscape level changes such as reduced grazing areas, increased invasive plants and noxious weeds, and increased vehicle and roadway related livestock collisions.

4.13.2 Areas of Critical Environment Concern (ACEC)

An activity plan and associated NEPA have not been completed for Lears Canyon ACEC or any other ACEC's on the VFO. No site-specific Decisions have been put into place, and ACEC areas throughout the field office have not received special fencing or other improvements at this time. The Lears Canyon ACEC is currently accessible for grazing except where natural barriers may inhibit livestock movement. Cumulative impacts of the proposed action would be the Lears Canyon ACEC's lack of contribution to the continued preclusion, throughout the Field Office, of establishment of baseline or relict vegetation areas excluded from grazing, regardless of whether or not this exclusion would result in increases or decreases in Rangeland Health Standards.

4.13.3 Invasive Plants/Noxious Weeds

Cumulative effects regarding noxious weeds in the greater Argyle Ridge area include species that are found in riparian areas and can spread further into Nine-Mile Creek and the Green River watershed. The headwaters above the grazing allotments have intermixed land ownership and noxious weeds do occur here and are a seed source for public lands downstream. Private and public land grazing, recreation, fire, vehicle and county road maintenance and use all contribute to noxious weed components of the area. The VFO's Integrated Noxious Weed Program will continue to address noxious weeds in the area as time and budgets allow, with prioritization on early detection and rapid response.

4.13.4 Vegetation and Soils

Wildfire, forest insects, continued erosion of natural landslide areas, naturally erosive soils, and possible long-term climate change or precipitation shift, could reasonably be expected to continue to be the largest change agents for vegetation and soils in the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments. Cumulative impacts from the Alternative A (No Action) and Alternative B (Proposed Action) on vegetation and soil conditions would be expected to be widely mitigated by ongoing monitoring, allotment assessment, proposed changes to the Terms and Conditions of the Term Grazing Permit, and ongoing year-to-year grazing authorized use adjustments based on local current conditions.

Cumulative effects of the no action alternative on vegetation and soils could foreseeably be positive or negative based on several variables. These could include the degree of intermixed private lands placed into subdivided human development following possible ranch failure, climate and precipitation events during the ten-year cycle, soil biological crust response and unknown noxious weed and litter layer responses in various plant communities in the area. These responses, after livestock grazing ceases have run the gamut on other western allotments to increased weed activity in riparian areas (monocultures of tall white top and Canada thistle forming) to decreased plant and forb diversity in more productive sites where bunchgrass litter can become decadent during abundant moisture years and shading can prevent germination of other species.

4.13.5 BLM Sensitive Plant Species

The cumulative impact area for each Utah BLM Sensitive plant species is the range of the species. As the extent of populations nor the habitat for any of the species identified within these allotments the have been mapped and as underlying edaphic conditions in this area have not been mapped at a resolution needed to make inferences about the potential range of the species are lacking, cumulative impacts will be discussed qualitatively.

Reasonable foreseeable actions within the allotment include increased recreational activities (camping, hiking, hunting, fishing, off-highway vehicle use), and continued grazing activities. The Proposed Action Alternative would provide Standard Terms and Conditions in accordance with BLM's Land Use Plan during seasons of use. It is anticipated that the Proposed Action Alternative would allow both diversity and biomass of native forbs, including Utah BLM sensitive species. As the Proposed Action Alternative would apply Standard Terms of Conditions, the BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization.

4.13.6 Livestock Grazing and Rangeland Health

4.13.6.1 Alternative A: No Action

Cumulative effects from livestock grazing in these three allotments under the No Action alternative could have positive and negative effects on both the livestock producers and livestock-available forage and plant communities. A longer season of use for the Lears Canyon allotment during the growing season would still be allowed. The current use also involves more livestock on the ground at any given time over a shorter season of use. Cumulative effects of this use include weed, plant community, soil and livestock changes that are acceptable, but not meeting best management practices. The Argyle Ridge Allotment would continue to have a slightly later season of use for two permittees, however, this would not be as effective for monitoring, compliance and permittee cooperative opportunities. Livestock related cumulative effects will remain as is in Water Canyon #1 at this time.

Cumulative effects regarding range improvements, spring developments and access roads would remain the same in the area under the No Action and the Proposed Action alternatives with respect to ongoing maintenance and use. There are no new improvements proposed under either alternative and no new landscape effects from new roads, water development sources would be considered.

4.13.6.2 Alternative B: Proposed Action

In addition to the applicable cumulative effects listed above in the No Action alternative, livestock grazing in the Argyle Ridge, Lears Canyon, and Water Canyon #1 Allotments under the Proposed Action alternative would be expected to have positive and some slight negative effects on both the livestock producers and livestock-available forage and plant communities.

The proposed longer season of use, with fewer animals, should improve the Lears Canyon Allotment during establishment of the growing season. Cumulative effects of this use include weed, plant community, soil and livestock changes that are more aligned with range-related best management practices for the areas. The Argyle Ridge Allotment will have a slightly earlier season of use for two permittees, however, this is expected to be offset by increased standardization for monitoring, compliance and permittee cooperative opportunities. Livestock-related cumulative effects will remain as is in Water Canyon #1 at this time.

4.13.6.3 Alternative C: No Grazing

Selection of the No Grazing alternative would negatively affect the local permittees. If BLM began selecting No-Grazing alternatives region wide or on many western allotments, this would be expected to have a cumulatively negative affect on rural communities and their local economies. With the loss of public land grazing, many permittees would have to scale back their

operations or liquidate their livestock operations. Under the No Grazing Alternative, grazing allotments could foreseeably become surrounded by increasingly dissected privately owned bottomlands, and former ranches could continue to be developed for cabins and vacation properties.

Cumulative effects from unused range improvements and access roads could be negative due to deterioration and lack of maintenance with respect to fences and spring developments.

4.13.7 Rangeland Health

The allotments are located at the far southwest corner of the VFO, bordering and crossing into the Price Field Office boundary in an area where wildfire activity, coniferous insects, naturally erosive soils, possibly climate change and noxious weeds continue to influence the Rangeland Health of the area. These influences reasonably would be expected to at least equal, and likely exceed the overall influence of livestock grazing at the proposed use levels on Rangeland Health. Stocking rates have been reduced over the past decade by approximately 27%. From historical accounts, early twentieth-century grazing use throughout the area was significantly higher, especially in canyon bottomlands. All three allotments show positive indications of upward Rangeland Health trend for soils and vegetation, as would be expected with the history of stocking (AUM) adjustments, annual management adjustments and ongoing assessments.

4.13.8 Water: Ground Water Quality, Hydrologic Conditions, and Surface Water Quality

Similar surface water impairment categorization occurs throughout the Argyle Ridge area streams, on variously owned lands in various livestock grazing regimens. Cumulatively, the Proposed Action could improve riparian conditions in Lears Canyon to improve downstream conditions, although this has been found to be difficult to quantify where mixed used grazing occurs at low to moderate levels.

Ground water quality and quantity would be expected to be a greater function of greater area surface rates of use for agriculture and urban areas, energy development and extent of adequate sealing during drilling, and precipitation and recharge rates based on long-term climate events.

4.13.8 Proper Functioning Condition

PFC sites selected within these allotments indicate an upward trend with in these sites under current grazing conditions in recent years. Livestock grazing indicators have determined that most disturbance to PFC sites are due to natural occurrences (ie., fire, flash flooding). Overgrazing of PFC sites has been minimalized due to the use of summer and fall grazing seasons.

It would not be expected that sediment loading and stream sinuosity or depth would be significantly changed by removal of livestock as bank vegetation is intact and slope cutting is occurring on the outside edge of meanders as is common in semi-arid creek systems where flash flooding is common and expected. These bank cuts are steep and flash-event caused, and are largely inaccessible and/or used by livestock for access to water or forage. Water access along the streams for livestock in these canyons is fairly open and accessible in many reaches, and concentrated livestock use on BLM lands was found to be isolated. Concentrated livestock and other uses influencing water quality and PFC conditions were anecdotally more commonly observed on smaller adjacent, privately owned parcels where grazing, vehicle-crossing, and water development structures and vegetation changes were more apparent adjacent to stream-side residences on private lands along the allotments' stream reaches.

4.13.10 Wildlife

4.13.10.1 Migratory birds (including raptors)

The cumulative impact analysis area for avian species is the three identified allotments analyzed in this EA. The allotments contain roosting, nesting, and foraging habitat. The existing condition of these habitats is addressed in Chapter 3 of this document and the potential impacts from livestock grazing through the range of alternatives are discussed in Chapter 4 of this document.

Reasonable foreseeable actions identified within the allotment include an increase in recreational activities and oil and gas exploration and development. Recreational activities consist of camping, hiking, hunting, and off-highway vehicle use. Oil and gas exploration and development include seismic activities, well pad construction, and associated oil and gas infrastructure construction. However, these activities are not expected to appreciably impact the habitats of the subject species.

The Proposed Action Alternative would not appreciably contribute to the cumulative impacts for avian species. The proposed action would provide Standard Terms and Conditions in accordance with BLM's Land Use Plan during seasons of use. Grazing dates for the Lears Canyon Allotment would be consistent with the other allotments allowing a longer growing season for plants during the critical growing season. It is anticipated that the Proposed Action Alternative would allow both diversity and biomass of desirable forbs, cool season grasses, and shrubs to continue to meet Rangeland Health Standards. As the Proposed Action Alternative would apply Standard Terms of Conditions the BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached. The No Action Alternative would not include Standard Terms of Conditions and livestock grazing would be allowed during the critical growing season within the Lears Canyon Allotment. The No Grazing Alternative would have year-long seasonal rest from livestock grazing and wildlife impacts to vegetation and soils would continue to occur which may increase with available forage.

4.13.10.2 Fish and Wildlife Excluding USFWS Designated Species

4.13.10.2.1 Big Game

The cumulative impact area for big game species would be the Argyle Ridge, Lears Canyon, and Water Canyon watersheds. The allotments contain crucial deer and elk summer and winter range habitat. The allotments consist of approximately 1,089 acres of crucial elk winter habitat, 645 acres of elk crucial summer habitat, 17,850 acres of crucial deer summer habitat, and 816 acres of crucial deer winter habitat.

Reasonable foreseeable actions within the allotment include increased recreational activities (camping, hiking, hunting, fishing, off-highway vehicle use), and continued grazing activities. The Proposed Action Alternative would provide Standard Terms and Conditions in accordance with BLM's Land Use Plan during seasons of use. Grazing dates would allow a longer growing season for plants during the critical growing season. It is anticipated that the Proposed Action Alternative would allow both diversity and biomass of desirable forbs, cool season grasses, and shrubs to continue to meet Rangeland Health Standards. As the Proposed Action Alternative

would apply Standard Terms of Conditions the BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. The No Action Alternative would not include Standard Terms of Conditions and livestock grazing would be allowed during the critical growing season (May) within the Lears Canyon Allotment. The No Grazing Alternative would have year-long seasonal rest from livestock grazing which may increase the available forage for wildlife species.

4.13.10.3 Threatened, Endangered, Proposed or Candidate Species

4.13.10.3.1 Mexican Spotted Owl (Federally Threatened)

The cumulative impact analysis area for MSO is Argyle Canyon and Nine Mile Canyon of which consists of approximately 44,323 acres of MSO nesting habitat. Argyle Ridge and Lears Canyon Allotments consists of approximately 6,658 acres of MSO nesting habitat (15% of the cumulative impact analysis area). The existing condition of MSO habitat is addressed in Chapter 3 of this document and the potential impacts from livestock grazing through the range of alternatives are discussed in Chapter 4 of this document.

Reasonable foreseeable actions identified within the allotment include an increase in recreational activities and oil and gas exploration and development. Recreational activities consist of camping, hiking, hunting, and off-highway vehicle use. Oil and gas exploration and development include seismic activities, well pad construction, and associated oil and gas infrastructure construction. However, these activities are not expected to appreciably impact the habitats of the subject species.

The Proposed Action Alternative would not appreciably contribute to the cumulative impacts within MSO habitat. The Proposed Action Alternative would provide Standard Terms and Conditions in accordance with BLM's Land Use Plan during seasons of use. Grazing dates for Lears Canyon would be consistent with the other allotments allowing a longer growing season for plants during the critical growing season. It is anticipated that the Proposed Action Alternative would allow both diversity and biomass of desirable forbs, cool season grasses, and shrubs to continue to meet Rangeland Health Standards. As the Proposed Action Alternative would apply Standard Terms of Conditions the BLM will continue to assess resource conditions through field inspections and determine management changes (e.g. changes in livestock numbers, adjustment of move dates, or other changes of use) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached. The No Action Alternative would not include Standard Terms of Conditions and livestock grazing would be allowed during the critical growing season within the Lears Canyon Allotment. The No Grazing Alternative would have year-long seasonal rest from livestock grazing and wildlife impacts to vegetation and soils would continue to occur which may increase with available forage.

5.0 CONSULTATION AND COORDINATION

5.1 Introduction

During preparation of the EA, public involvement consisted of posting the proposal on the Utah BLM Environmental Notification Bulletin Board (ENBB) on January 29, 2009. Issues or impacts identified through the interdisciplinary team analysis process are described in Appendix A. Due to the low impact nature of the proposal, limited additional consultation was needed. Consulted parties are listed in table 5.2 below.

5.2 Persons, Groups, and Agencies Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Fasselin, Scott & Jensen	Coordination with livestock Permittee	Proposed Action
Oman, Jacquelyn	Coordination with livestock Permittee	Proposed Action
Staker, James Allen	Coordination with livestock Permittee	Proposed Action
Terry, Dr. Dale	Coordination with livestock Permittee	Proposed Action
Day Family Living Trust	Coordination with livestock Permittee	Proposed Action
JTJJ Enterprises, LTD	Coordination with livestock Permittee	Proposed Action
Utah Division of Wildlife Resources	Coordination with Brian Maxfield, Brad Crompton	Proposed Action
U.S. Fish & Wildlife Service	Formal Consultation, under Section 7 of the ESA (16 USC 1531).	Consultation with the Service was completed through a Programmatic Biological Assessment in March 2010.
Hopi Tribe Cultural Preservation Office	Consultation and Coordination	Request for additional information 5/10/2012.
Utah State Historical Society, Salt Lake City Utah	Determination of Effects of Proposed Action 36 CFR (800.4)	No Adverse Effect (Letter April 19, 2010)

5.2.1 U.S. Fish and Wildlife Service

On May 14, 2009 a programmatic Biological Assessment (BA) was prepared by the BLM for federally listed fish and plant species that occur within the Vernal Field Office: bonytail, Colorado pikeminnow, humpback chub, razorback sucker, clay-reed mustard, Uinta Basin hookless cactus, Pariette cactus, Ute ladies-tresses, and White River beardtongue. On July 10,

2009, a Biological Opinion was received from the USWFS that concurred with BLM's findings for the above mentioned federally listed species and their designated critical habitats. The programmatic Biological Assessment (BA) was later amended in March 12, 2010 to include Mexican spotted owl and to add five allotments not included in the original BA. These three allotments analyzed in this EA fall within the scope of the programmatic consultation; therefore, consultation for the impacts to federally listed species under BLM's Preferred Alternative is complete.

5.2.2 Summary of Public Participation

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of any of the alternatives, as well as through public outreach via the Electronic Notification Bulletin Board (ENBB) system, and input from a BLM Interdisciplinary team.

6.0 REFERENCES

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Internet Documents

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BLM Documents

- Available for review at the Vernal Field Office
- Utah Standards and Guidelines for Healthy Rangelands
- Diamond Mountain Resource Management Plan/EIS, December 1994
- Permittee grazing case files
- BLM/NRCS Soil Survey/Ecological Site Descriptions
- Mexican Spotted Owl Habitat Evaluation

Appendix A: Interdisciplinary Team Analysis Record Checklist

INTERDISCIPLINARY TEAM CHECKLIST

Project Title: Argyle Ridge, Lears Canyon, and Water Canyon #1 Permit Renewal Environmental Assessment

NEPA Log Number: DOI-BLM-G010-2009-0218

File/Serial Number:

Project Leader: Marcus White Bull

DETERMINATION OF STAFF: *(Choose one of the following abbreviated options for the left column)*

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Determination	Resource/Issue	Rationale for Determination	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
NI	Air Quality & Greenhouse Gas Emissions	Vehicle emissions and fugitive dust associated with the proposed action would be localized, short-lived, and not thought to be outside of current levels, requiring no detailed analysis in the EA	Mark Wimmer	6/10/2013
NP	BLM Natural Areas	None present as per Vernal RMP/ROD and GIS layer review	Jason West	9/10/2010
NI	Cultural: Archaeological Resources	Cultural resource sites are present within the allotment, but they are not affected to a degree that a detailed analysis is required. A determination of "no adverse effect" was made and concurred by the SHPO on April 19 th 2010. Tribal concurrence received on Dec. 23, 2009	Keith Waldron	6/7/2010
NI	Cultural: Native American Religious Concerns	No Native American concerns identified. Native American access to the areas will not be impaired by the project.	Keith Waldron	6/7/2010
PI	Designated Areas: Areas of Critical Environmental Concern	Lears Canyon ACEC is Closed to motorized travel. The ACEC does not have site-specific planning, fencing or other implementation for exclusion of grazing use, motorized use, or other uses at this time. The Diamond Mountain Resource Area Plan and Record of Decision (1994) objective is: <i>"Retain the area's present natural Douglas Fir-mountain browse and pinyon-juniper communities, as a comparison or control area and to provide/set aside an area in a late to climax ecological stage for research and/or educational purposes within this vegetation community type"</i> for the Lears Canyon ACEC.	Maggie Marston	6/8/2013
NP	Designated Areas: Wild and Scenic Rivers	None present as per Vernal ROD and GIS Review.	Jason West	9/10/2010
NP	Designated Areas: Wilderness Study Areas	None present as per Vernal RMP/ ROD and GIS layer Review.	Jason West	9/10/2010
NI	Environmental Justice	The nearest identified minority/economically disadvantaged community is the Ute Tribe, however,	Mark Wimmer	6/10/2013

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		grazing operations on federal land have not been identified as an impacting activity in terms of environmental justice due to the small-scale of the operations. Therefore, this resource/issue will not be carried forward for further analysis.		
NP	Farmlands (prime/unique)	No prime or unique farmlands have been designated within County because a soil survey has not been completed. No irrigated farmlands are present.	Stan Olmstead	8/5/2010
NI	Fuels/Fire Management	Livestock grazing should lower fire behavior and intensity in the event of wildfire due to decrease in fine fuels. Grazing use is not expected to conflict or impact any previous or planned fuel treatments in the project area.	Hank Barela	6/14/2013
NI	Geology/Minerals/Energy Production	No range facilities are proposed. Grazing will not affect or conflict with mineral rights in the allotment due to the lack of surface disturbance being currently proposed in the area.	Betty Gamber	6/12/2013
PI	Invasive Plants/Noxious Weeds, Soils & Vegetation	Livestock grazing may encourage the establishment of invasive and noxious weeds within the allotment. Weeds will be controlled by the BLM using both grazing permit funding and appropriated funding under the VFO Integrated Weed Program, as weed sources in grazing allotments are derived from a multitude of sources. Soils and vegetation in the Lears Canyon allotment would be expected to respond positively to avoidance of grazing at the beginning of the growing season. Proposed grazing activities are not likely to affect Forest and Woodland resources.	Maggie Marston	6/8/2013
NI	Lands/Access	No conflict with rights of ways or other land uses would occur because no new facilities are proposed.	Mark Wimmer	6/11/2013
NP	Lands with Wilderness Characteristics (LWC)	None Present as per Vernal RMP/ROD and GIS layer review	Jason West	9/10/2010
PI	Livestock Grazing & Rangeland Health Standards	Under the proposed action, livestock grazing would be changed to alter the season of use on the three allotments See proposed action. Surveys for Rangeland Health Standards were conducted in June of 2008, and in June of 2013.	Alec Bryan Marcus White Bull	6/8/2013
NI	Paleontology	Low paleontological sensitivity and low potential for impacts by grazing activity to paleontological resources. Livestock and wildlife trampling is not a concern.	Betty Gamber	6/12/2013
PI	Plants: BLM Sensitive	The following UT BLM sensitive plant species are present or expected in the same or an adjacent subwatershed as the proposed project: Goodrich's columbine (<i>Aquilegia scopulorum</i> var. <i>goodrichii</i>), Untermann's fleabane (<i>Erigeron untermannii</i>), Goodrich's blazingstar (<i>Mentzelia goodrichii</i>), Argyle Canyon phacelia (<i>Phacelia goodrichii</i>), and Uinta greenthread (<i>Thelesperma caespitosum</i>). <ul style="list-style-type: none"> • Goodrich's columbine is present within the project area • Untermann's fleabane is present within the project area • Goodrich's blazingstar is present within the project area • Argyle Canyon phacelia is present within 	Aaron Roe	5/14/2013

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>the project area</p> <ul style="list-style-type: none"> • Uinta greenthread is present within the project area. 		
NP	Plants: Threatened, Endangered, Proposed, or Candidate	<p>The following federally listed, proposed, or candidate plant species are present or expected in the same or an adjacent subwatershed as the proposed project: Graham's penstemon (<i>Penstemon grahamii</i>), Pariette cactus (<i>Sclerocactus brevispinus</i>), and Uinta Basin hookless cactus (<i>Sclerocactus wellandicus</i>).</p> <ul style="list-style-type: none"> • All suitable geological strata is located outside of the potential elevation range for Graham's penstemon. Therefore, there is no potential habitat for Graham's penstemon within the project area. • The proposed project is located outside of the potential habitat polygon for the two federally protected species of <i>Sclerocactus</i>. Additionally, the proposed project does not contain soils known to support the species and is located outside of the potential elevation range of the species. Therefore, there is no potential habitat for these two species. 	Aaron Roe	5/14/2013
PI	Plants: Wetland/Riparian	Analysis for riparian vegetation included in the Invasive Plants/Noxious Weeds, Soils/Vegetation sections of the EA. Utilization standards have been added as conditions to the Term Permit to provide for bank protection, sediment entrapment, and riparian vegetation health.	Maggie Marston	6/8/2013
NI	Recreation	Public Access will not be impeded. Recreation has traditionally not shown reported impacts from grazing allotments in this area	Jason West	9/10/2010
NI	Socio-Economics	The proposed action and no action alternatives would have no localized effects on the individual permittees and on nearby communities. The no-grazing alternative would have localized affects as described under Livestock Grazing in this EA, however large-scale socio-economic effects to the area's economy would not be expected.	Mark Wimmer	6/10/2013
NI	Visual Resources	The grazing allotment falls within VRM Class Objectives II, III and IV. These classes allow for grazing and improvements to facilities, stock ponds, or other improvements necessary for grazing.	Jason West	9/10/2010
NP	Wastes (hazardous/solid)	No chemicals subject to SARA Title III in amounts greater than 10,000 lbs. would be used. No extremely hazardous substances as defined in 40CFR355 in threshold planning quantities would be used. No solids wastes would be used as per the proposed action.	Alec Bryan	6/11/2013
PI	Water: Floodplains	No HUD inventoried floodplains are present within the allotments. Data from and personal knowledge of the area. However flood plains are present in the Argyle Ridge, Minnie Maud, and Nine Mile drainages that could be utilized by livestock in places. Negative impacts would not be expected in these locales from livestock.	Stan Olmstead	8/5/2010
PI	Water: Groundwater Quality	The allotments are not located within Basin and Range Principle Aquifers within the State of Utah. (http://pubs.usgs.gov/ha/ha730/ch_c/jpeg/C031.jpeg) Where the water table does become more shallow, nitrification and bacteriological leaching concerns	Maggie Marston	6/9/2013

Field Office GIS
Stan Olmstead

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		would be similar to wildlife use and are considered to be limited.		
PI	Water: Hydrologic Conditions (stormwater)	Stream flows are quite low (several inches of water in a one meter channel, on average) in the Argyle Creek, for example, but during run-off events these flow rates can swell exponentially to several hundred cubic feet per second over several hours, or days. PFC conditions were reviewed in 2013 for Non-Functioning and Functional At-Risk sites and found to be in conformance with PFC site conditions described as Functional.	Maggie Marston	6/9/2013
NI	Water: Surface Water Quality	Both Argyle Creek and Minnie Maud Creek (both listed in UT14060005-003) in Utah's stream assessments are listed in the anti-degradation category of 3, which states that: " <i>Water quality degradation may be allowed outside of USFS boundary pursuant to anti-degradation review.</i> " The beneficial use classes are 2B, 3A and 4 which equate to infrequent primary contact recreation, cold water fishery/aquatic life and agriculture uses respectively. Both streams were listed as <i>impaired</i> in 2010 under class 3A, and the cause of impairment is listed as <i>Water Temperature</i> . http://wq.deq.utah.gov/ . Contributions to this impairment are largely thought to be due to erosive soils, Landslide ecological site units, and roadbed influences on riparian conditions and over-surface and stream deposition and flows.	Maggie Marston	6/9/2013
NP	Water: Waters of the U.S.	No waters of the U.S. are present within the allotment per the Vernal Field Office data files.	Stan Olmstead	9/21/2010
NP	Wild Horses	There are no HA or HMAs present as per the VFO ROD RMP and current GIS data layers.	Dusty Carpenter	6/12/2013
PI	Wildlife: Migratory Birds (including raptors)	Migratory birds and raptors are present within all of the allotments.	Brandon McDonald	5/31/2013
PI	Wildlife: Non-USFWS Designated	Crucial elk/deer winter and summer habitat has been identified within the allotments.	Dixie Sadlier	6/10/2013
NI PI	Wildlife: Threatened, Endangered, Proposed or Candidate	Greater sage-grouse PPH areas are present within two of the allotments. The proposed action is consistent with the guidelines established in Utah IM-2012-043. Personal communication with UDWR Sensitive Species Biologist 2013. Potential Mexican spotted owl nesting habitat present within the Argyle Ridge and Lears Canyon Allotments.	Dixie Sadlier Brandon McDonald	6/10/2013 5/31/2013
NI	Woodlands/Forestry	Proposed grazing activities are not likely to affect Forest and Woodland resources.	David Palmer	1/28/2011

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator	<i>Jelly Buxton</i>	<i>06/21/2013</i>	
Authorized Officer	<i>Mehelle Bean</i>	<i>6/25/13</i>	

Appendix B: Threatened, Endangered, Candidate, Utah Special Status Animal Species including Partners-In-Flight Species of Concern

			Potential for Occurrence Within the	Eliminated From
Bonytail (<i>Gila elegans</i>)	FE	Colorado River system.	None	Yes
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	FE	Colorado River system.	None	Yes
Humpback chub (<i>Gila cypha</i>)	FE	Colorado River system.	None	Yes
Razorback sucker (<i>Xyrauchen texanus</i>)	FE	Colorado River system.	None	Yes
Black-footed ferret (<i>Mustela nigripes</i>)	FE	Semi-arid grasslands and mountain basins. Distribution of this species is limited to a nonessential experimental	None	Yes
Canada Lynx (<i>Lynx lynx Canadensis</i>)	FT	Primarily occurs in Douglas-fir, Spruce-fir, and subalpine forests at elevations above 7,800 feet amsl.	None	Yes
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	FT; PIF	In Utah, the species is primarily found in mesic (moister/cooler) canyons with mixed conifer or riparian	Low. No MSO have been observed within the project area and no Critical	No
Western yellow-billed cuckoo (<i>Coccyzus americanus</i>)	FC; PIF	Riparian; large tracts of cottonwood/willow habitats; Lowland deciduous woodlands, alder thickets, deserted	None	Yes
Greater Sage-grouse (<i>Centrocercus urophasianus</i>)	FC; PIF	Inhabits foothills, plains, mountain slopes, and other upland habitats dominated by sagebrush communities.	Low	No
Bluehead sucker (<i>Catostomus discobolus</i>)	CAS	Colorado River system.	None	Yes
Flannelmouth sucker (<i>Catostomus latipinnis</i>)	CAS	Colorado River system.	None	Yes
Roundtail chub (<i>Gila robusta</i>)	CAS	Colorado River system.	None	Yes
Colorado River Cutthroat trout (<i>Oncorhynchus clarkii pleuriticus</i>)	CAS	Cool, clear water and well-vegetated stream systems; thrives at high elevations. Occurs also in lakes/reservoirs.	None. There in coordination there is no pure strain CRCT within the allotments.	Yes
Northern Goshawk (<i>Accipiter gentilis</i>)	CAS	Deciduous, coniferous, and mixed forests. Typically mature and old growth forests and generally selects larger	Low. No known nests; however allotments contain nesting habitat.	No
Bald eagle (<i>Haliaeetus leucocephalus</i>)	WSC	Bays, rivers, lakes/reservoirs that reflect the general availability of primary food sources. Roosts are typically	None	Yes

			Potential for Occurrence Within the	Eliminated From
American white pelican (<i>Pelecanus erythrorhynchos</i>)	WSC; PIF	Riparian areas with open water including large rivers, lakes/reservoirs, and ponds.	None	Yes
Ferruginous hawk (<i>Buteo regalis</i>)	WSC; PIF	Open country, plains, badlands; sagebrush, saltbush-greasewood shrubland, pinyon-juniper and other woodland,	None	Yes
Burrowing owl (<i>Athene cunicularia</i>)	WSC	Desert, semi-desert shrubland, grasslands, and agriculture areas. Nesting consists of flat, dry, and open terrain; short	None	Yes
Mountain plover (<i>Charadrius montanus</i>)	WSC; PIF	Shrub-steppe habitat where vegetation is sparse and sagebrush communities are dominated by <i>Artemesia</i> spp.	None	Yes
White-tailed prairie dog (<i>Cynomys leucurus</i>)	WSC	Inhabits grasslands, plateaus, plains and desert shrub habitats.	None	Yes
Short-eared owl (<i>Asio flammeus</i>)	WSC	Inhabits arid grasslands, agricultural areas, marshes, and occasionally open woodlands. In Utah, cold desert shrub	Moderate	No
Lewis's Woodpecker (<i>Melanerpes lewis</i>)	WSC; PIF	Pine forests, riparian, agriculture, and pinion-juniper woodlands.	Moderate. No known occurrences; however, nesting habitat is available	No
Three-toed Woodpecker (<i>Picoides tridactylus</i>)	WSC; PIF	Prefers coniferous forest, primarily spruce and balsam fir.	None	Yes
Grasshopper sparrow (<i>Ammodramus savannarum</i>)	WSC; PIF	Grasslands of intermediate height associated with clumped vegetation and patches of bare ground; other requirements	None	Yes
Long-billed Curlew (<i>Numenius americanus</i>)	WSC; PIF	Shortgrass prairies, alpine meadows, riparian woodlands, and reservoir habitats.	None	Yes
Bobolink (<i>Dolichonyx oryzivorus</i>)	WSC; PIF	Mesic and irrigated meadows, riparian woodlands, and subalpine marshes at lower elevations (2,800 to 5,000 feet	None	Yes
Big free-tailed bat (<i>Nyctinomops macrotis</i>)	WSC	Rocky areas in rugged country; lowlands of river floodplain-arroyo association; shrub desert and woodland	Moderate. Habitat for this species is present within the allotments; however,	Yes
Fringed myotis (<i>Myotis thysanodes</i>)	WSC	Caves, mines, and buildings, most often in desert and woodland areas.	Moderate. Habitat for this species is present within the allotments; however,	Yes
Spotted bat (<i>Euderma maculatum</i>)	WSC	Desert shrub, sagebrush-rabbit brush, pinion-juniper woodland, and ponderosa pine and montane forest habitats;	Moderate. Habitat for this species is present within the allotments; however,	Yes
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	WSC	Semidesert shrublands and pinion-juniper woodlands to open montane forests.	Moderate. Habitat for this species is present within the allotments; however,	Yes
Western (Boreal) toad (<i>Bufo boreas</i>)	WSC	Slow moving streams, wetlands, desert springs, ponds, lakes/reservoirs, and meadows.	None	Yes
Corn snake (<i>Elaphe guttata</i>)	WSC	Habitat includes pine woodlands, brushy fields, open hardwood forests, mangrove thickets, barnyards, and	None	Yes

			Potential for Occurrence Within the	Eliminated From
Smooth green snake (<i>Ophedrys vernalis</i>)	WSC	Meadows, grassy marshes, moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open	None	Yes
Prairie falcon (<i>Falco mexicanus</i>)	PIF	Alpine, cliff, cropland/hedgegrow, desert, and grassland/herbaceous areas.	Low. No known nests; however allotments contain nesting habitat.	No
Swainson's hawk (<i>Buteo swainsonii</i>)	PIF	Grasslands, deserts, agricultural areas, shrublands, marshlands, and riparian forests.	None	Yes
Black-chinned hummingbird (<i>Archilochus alexandri</i>)	PIF	Dry lowlands and foothills with pinion-juniper woodlands.	Low	No
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	PIF	Open woodland, pinion-juniper, pine-oak, and conifer-aspen; brushy hillsides; montane scrub and thickets.	Low	No
Brewer's sparrow (<i>Spizella breweri</i>)	PIF	Desert and shrubland/chaparral.	Moderate	No
Cassin's finch (<i>Carpodacus cassinii</i>)	PIF	Open coniferous forest; in migration and winter also in deciduous woodland, secondary growth, scrub, brushy	High	No
Cassin's kingbird (<i>Tyrannus vociferan</i>)	PIF	Sparse woods and dry scrub areas.	High	No
Clark's nutcracker (<i>Nucifraga Columbiana</i>)	PIF	Open coniferous forest, forest edge and clearings, primarily in mountains, but wandering into various habitats; in winter	High	No
Gray flycatcher (<i>Empidonax wrightii</i>)	PIF	Arid areas of sagebrush or pinion-juniper woodlands.	High	No
Gray vireo (<i>Vireo vicinior</i>)	PIF	Dry shrubby areas, chaparral, and sparse woodlands.	High	No
Green-tailed towhee (<i>Pipilo chlorurus</i>)	PIF	Low shrubs, open pinion-juniper woodlands.	Moderate	No
Juniper titmouse (<i>Parus inornatus</i>)	PIF	Sparse pinion-juniper and oak woodlands.	Moderate	No
Mountain bluebird (<i>Sialia currucoides</i>)	PIF	Subalpine meadows, grasslands, shrub-steppe, savanna, and pinion-juniper woodlands.	High	No
Pinion jay (<i>Gymnorhinus cyanocephalus</i>)	PIF	Semi-arid foothills with pinion-juniper woodlands.	High	No
Sage sparrow (<i>Amphispiza belli</i>)	PIF	Dry sagebrush/scrublands with sparse vegetation.	High	No
Sage thrasher (<i>Oreoscoptes montanus</i>)	PIF	Desert and shrubland/chaparral.	High	No

			Potential for Occurrence Within the	Eliminated From
Virginia's warbler (<i>Vermivora virginiae</i>)	PIF	Dry woodlands, scrub oak brushlands, canyons and ravines.	Moderate	No
White-throated swift (<i>Aeronautes saxatalis</i>)	PIF	Cliffs, canyons, and ravines.	Moderate	No
Wilson's phalarope (<i>Phalaropus tricolor</i>)	PIF	Grassland/herbaceous riparian and wetlands.	Low	No

Federally Listed Species:

- FE = Federally listed as endangered;
- FT = Federally listed as threatened; and
- FC = Federally listed as candidate

BLM/State Sensitive Species:

- CAS = State Conservation Agreement Species; and
- WSA = Wildlife Species of Concern

PIF = Partners in Flight species of concern, Colorado Plateau, Utah Mountains, potentially in the Vernal Field Office.

Appendix C: Houndstongue Comparison Photos



Photo 1 (Water Canyon #1) 1981 Utilization Plot (Photo 1, 1981)



Photo 2 (Argyle Ridge #3-1) 1983 Utilization Plot (Photo 2, 1983)



Photo 3 (Water Canyon #1) 2013 RH Transect (Photo 3, 2013)

Appendix D: Rangeland Health

D-1 Argyle

AR ~~2~~

A grasses

P. grasses
western wheat Kentucky bluegrass bluebunch
HTT HTT III I HTT HTT III

H. forb. sickweed houndstongue
I

P. forb. yellow Astragalus spp purslytes dandelion rocky m. penstemon salsify nut pine

Cryptantha spp Eriogon spp. unk forb = 1
HTT desert daisy Hegemopappus filifolia

shrubs wildrose ~~gambel oak~~ rubber rabbit brush yg sagebrush snowberry
HTT III

broom snakeweed silva sage? weed sagewort

trees lt juniper piñon pine

succulents

lava ground litter rock standing dead crypts Moss
HTT HTT I HTT

Record rating (1-6) in shaded cells. Cells are arranged in 3 x 6 pattern of typical kit (see diagram)

Loc	Surface			1 inch			Loc	Surface			1 inch			Loc	Surface			1 inch		
	In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#
	0:00	5:00	3	0:45	5:45	3		1:30	6:30	3	2:15	7:15	3		3:00	8:00	3	3:45	8:45	3
	0:15	5:15	3	1:00	6:00	3		1:45	6:45	3	2:30	7:30	3		3:15	8:15	4	4:00	9:00	3
	0:30	5:30	3	1:15	6:15	3		2:00	7:00	4	2:45	7:45	3		3:30	8:30	5	4:15	9:15	3

45
13
58

"Loc" is location (e.g., location along a line transect if used). It is optional.

Samples should be less than 1/4" in diameter and less than 1/8" thick.

"Surface" is soil surface sample. "1 inch" is removed from soil 3/4 - 1" below surface.

Table 1. Soil Stability Evaluation for 1/4"-diameter Air-Dry Samples

ALWAYS Sieve Soils (even if rated ≤ 3) to Verify Class	
Stability class	Criteria for assignment to stability class (for Standard Characterization)*
0	Soil too unstable to sample (falls through sieve)*.
1	50 % of structural integrity lost within 5 seconds of insertion in water.
2	50 % of structural integrity lost 5—30 seconds after insertion.
3	50 % of structural integrity lost 30—300 seconds after insertion or <10% of soil remains on sieve after 5 dipping cycles.
4	10 - 25% of soil remains on sieve after 5 dipping cycles.
5	25 - 75% of soil remains on sieve after 5 dipping cycles.
6	75 - 100% of soil remains on sieve after 5 dipping cycles.

* If too unstable to sample, try gently wetting with a mister (perfume bottle available at drug stores), remove sample, and allow to air-dry before testing.

Rangeland Health Indicator Evaluation Matrix

(concluded)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive Capability of Perennial Plants (native or seeded) (Default Descriptor)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions.
17. Reproductive Capability of Perennial Plants (native or seeded) (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
13. Plant Mortality/Decadence (Default Descriptor)	Dead and/or decadent plants are common.	Dead and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
13. Plant Mortality/Decadence (Revised Descriptor)					✓
14. Litter Amount (Default Descriptor)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
14. Litter Amount (Revised Descriptor)					✓
15. Annual Production (Default Descriptor)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
15. Annual Production (Revised Descriptor)					✓
16. Invasive Plants (Default Descriptor)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily on disturbed sites.	Rarely present on the site.
16. Invasive Plants (Revised Descriptor)			✓ <i>high impact disturbance (-)</i>		

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
11. Compaction Layer (below soil surface) (Default Descriptor)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread; moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal; not restrictive to water movement and root penetration.
11. Compaction Layer (below soil surface) (Revised Descriptor)					✓
12. Functional/ Structural Groups (F/S Groups) (Default Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)	Number of F/S groups greatly reduced; and/or relative dominance of F/S groups has been dramatically altered; and/or number of species within F/S groups dramatically reduced.	Number of F/S groups reduced; and/or one dominant group and/or one or more subdominant groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced; and/or one or more subdominant F/S groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced; and/or relative dominance of F/S groups has been modified from that expected for the site; and/or number of species within F/S groups slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
12. Functional/ Structural Groups (F/S Groups) (Revised Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default Descriptor)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded than, that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.
9. Soil Surface Loss or Degradation (Revised Descriptor)					✓
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Default Descriptor)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
7. Litter Movement (wind or water) (Default Descriptor)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
7. Litter Movement (wind or water) (Revised Descriptor)					✓
8. Soil Surface Resistance to Erosion (Default Descriptor)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
8. Soil Surface Resistance to Erosion (Revised Descriptor)					✓ rocks & plants

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground (Default Descriptor)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderately to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally match that expected for the site.
4. Bare Ground (Revised Descriptor)					✓
5. Gullies (Default Descriptor)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon with vegetation stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
5. Gullies (Revised Descriptor)					✓
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Default Descriptor)	Extensive.	Common.	Occasionally present.	Infrequent and few.	Matches what is expected for the site.
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

State UT Office OFU Ecological Site _____ Site ID AR 1
 If indicator(s) revised - Observer(s) Olsonstead, Wimmer, Zeddyig Date 6/19/08

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills (Default Descriptor)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
1. Rills (Revised Descriptor)					✓
2. Water Flow Patterns (Default Descriptor)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
2. Water Flow Patterns (Revised Descriptor)					✓
3. Pedestals and/or Terracettes (Default Descriptor)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns and/or on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.
3. Pedestals and/or Terracettes (Revised Descriptor)					✓

Functional/Structural Groups Worksheet

State WI Office DBD Ecological Site _____ Site ID AR 1
 Observer(s) Olsonstead, Williams, Zwitring Date 6/19/08

Functional/Structural Groups			Species List for Functional/Structural Groups
Name	Potential ¹	Actual ²	Plant Names
<i>perennial grasses</i>		<i>D-S</i>	<i>see back sheet</i>
<i>annual forbs</i>		<i>T</i>	↓
<i>perennial forbs</i>		<i>M-T</i>	
<i>shrubs</i>		<i>M-T</i>	
<i>trees</i>		<i>M-T</i>	
Biological Crust ³			

Indicate whether each "structural/functional group" is a **Dominant (D)** (roughly 41-100% composition), a **Subdominant (S)** (roughly 11-40% composition), a **Minor Component (M)** (roughly 3-10% composition), or a **Trace Component (T)** (<3 % composition) based on weight or cover composition in the area of interest (e.g., "Actual²" column) relative to the "Potential¹" column derived from information found in the ecological site description and/or at the ecological reference area.

Biological Crust³ dominance is evaluated solely on **cover** not composition by weight.

Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using cover or weight .

Dominant Species on Site

- 1 subsp. rabbitbrush
- 2 western wheatgrass
- 3 blackbrush wheatgrass
- 4 Wyoming sagbrush

Noxious Weeds

- 1 roundstongue
- 2 _____
- 3 _____

Invasive Natives *increased*

- 1 Utah juniper
- 2 Pinyon pine
- 3 _____

Invasive Exotics

- 1 dandelion (?)
- 2 _____
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Cover Worksheet

State VT Office 080 Ecological Site _____
 Observer(s) Newberry, Olmstead, Palmer Date 06/19/08 Site ID AR 1
Wimmer, Zwetzig

LIFE FORMS ¹	COVER CLASSES (% Canopy)							
	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Grass								
Annual	✓							
Native Perennial						✓		
Exotic Perennial			✓					
II - Forb								
Annual		✓						
Perennial				✓				
III - Shrub								
IV - Tree								
V - Succulent								
VI - Biological Crust								
	✓							
		✓						
% GROUND COVER ²	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Vascular Plants								✓
II - Standing Dead Vegetation		✓						
III - Litter (in contact with the soil surface)		✓						
IV - Biological Crust		✓						
V - Rock/Gravel			✓					
VI - Bare Ground				✓				

¹ **Life Forms Cover** - Record multiple canopy cover classes; total plant canopy may exceed 100%. Small openings (less than 2" in diameter) are included as cover.

² **Ground Cover** - Category I is an estimate of total vascular plant cover; overlapping canopies are counted as only **one** canopy (record life form with first point of contact). Total vascular plant cover (I) together with the sum of cover in Categories II-VI should total to approximately 100%.

Notes: Include source of cover data (e.g., estimates or measurements)

Part 2. Indicator Rating (continued)

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
H	7. Litter Movement					✓
Comments:						
S,H,B	8. Soil Surface Resistance to Erosion					✓
Comments:						
S,H,B	9. Soil Surface Loss or Degradation					✓
Comments:						
H	10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					✓
Comments:						
S,H,B	11. Compaction Layer					✓
Comments:						
B	12. Functional/Structural Groups					✓
Comments:						
B	13. Plant Mortality/Decadence					✓
Comments:						
H,B	14. Litter Amount					✓
Comments:						
B	15. Annual Production					✓
Comments:						
B	16. Invasive Plants			✓		✓
Comments:						
B	17. Reproductive Capability of Perennial Plants					✓
Comments:						

Part 3. Summary

Departure from Ecological Site Description/
Ecological Reference Area(s)

A. Indicator Summary

Rangeland Health Attributes		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	Σ
S	Soil/Site Stability (Indicators 1-6, 8, 9 & 11)						9
H	Hydrologic Function (Indicators 1-5, 7-11 & 14)						11
B	Biotic Integrity (Indicators 8-9 & 11-17)						9

B. Attribute Summary - Check the category that best fits the "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings in the preceding Indicator Summary table.

Attribute	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability Rationale:					✓
Hydrologic Function Rationale:					✓
Biotic Integrity Rationale:					✓

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation (Bold items require completion, other information is optional)

State Ut Office 080 Management Unit Angyle Ridge
 Pasture/Watershed _____ ID# AR 1 Major Land Resource Area _____
 Location (description) X^c 230761.97 Y=4414537.55 NAD 83 (conus) UTM Zone 12N
 Legal T _____, R _____, Sec _____, _____ 1/4, _____ 1/4 or Lat _____, Long _____ or UTM Coord _____
 Size of Evaluation Area 5-7 acres Photo(s) Taken Yes No _____
 Observer(s) Newberry, Christal Palmer, Wimmer, Zwetzig Date 6/19/08
 Ecological Site _____ Soil Map Unit Name _____

Soil/Site Verification

Rangeland Ecological Site Description and/or Soil Survey _____ Area of Interest Determination _____
 Surface Texture _____ Surface Texture _____
 Depth: Very Shallow Shallow Moderate Deep Depth: Very Shallow Shallow Moderate Deep
 (<10") (10"-20") (20"-40") (>40") (<10") (10"-20") (20"-40") (>40")
 List diagnostic horizons in profile and depth List diagnostic horizons in profile and depth
 1 _____ 3 _____ 1 _____ 3 _____
 2 _____ 4 _____ 2 _____ 4 _____

Parent Material _____ Slope 5-10% Elevation _____ ft Topographic Position _____ Aspect S-SE

Avg Annual Precip 10-12" Recent Weather (last 2 years) Drought 107 Normal 128 Wet _____

Describe wildlife and livestock use and recent disturbances deer, elk, rabbit, recent cow sign, rd to west, very small site, few aerial sites on Angyle Ridge

Describe offsite influences on area of interest _____

Part 2. Indicator Rating

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
S,H	1. Rills					✓
	Comments:					
S,H	2. Water Flow Patterns					✓
	Comments:					
S,H	3. Pedestals and/or Terracettes					✓
	Comments:					
S,H	4. Bare Ground					✓
	Comments:					
S,H	5. Gullies					✓
	Comments:					
S	6. Wind-Scoured, Blowouts, and/or Deposition Areas					✓
	Comments:					

AR 1b



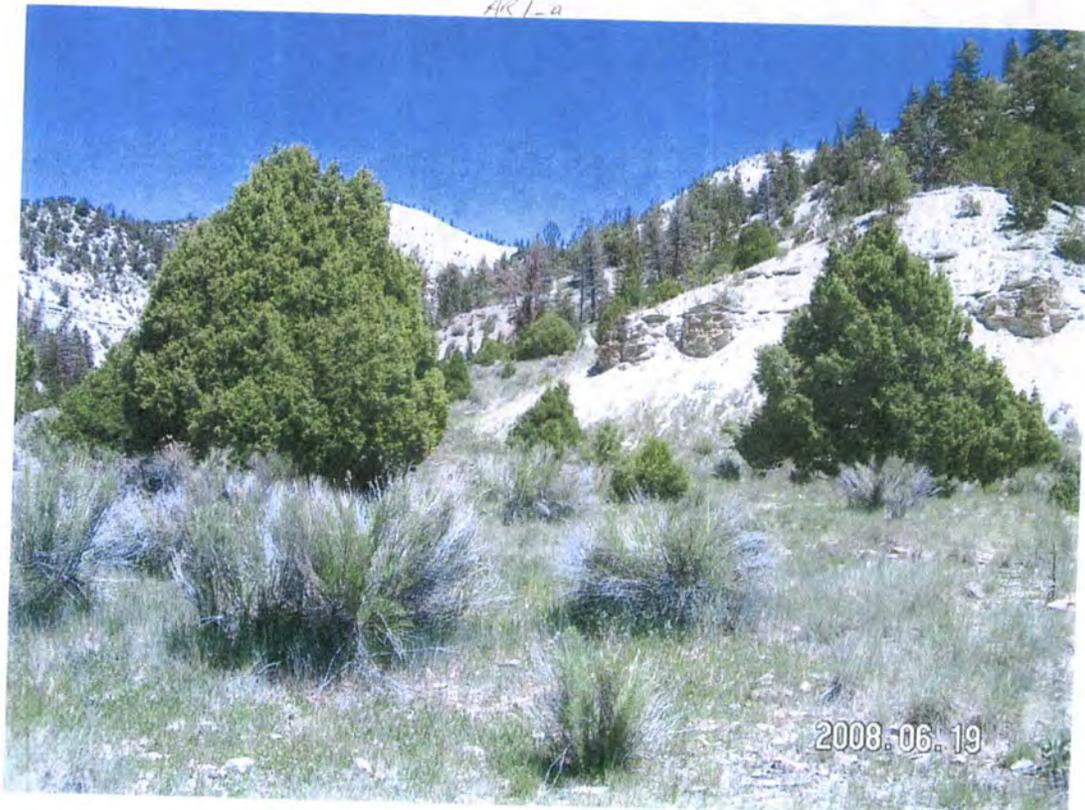
AR 1c



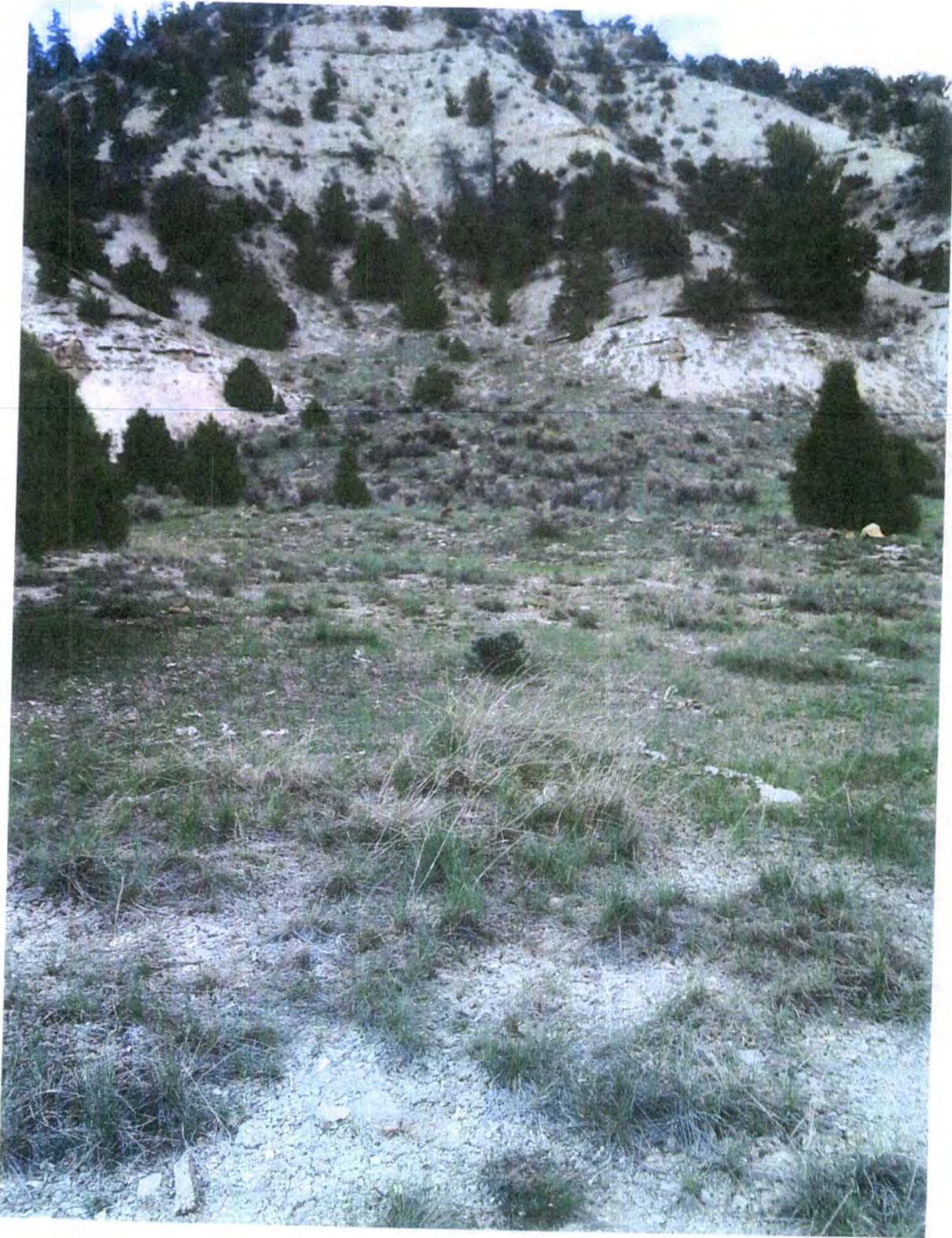
AR 1d



AR 1-a







Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation (Bold items require completion, other information is optional)

State UT Office 080 Management Unit Angels Canyon Ridge
 Pasture/Watershed _____ ID# AR2 Major Land Resource Area _____
 Location (description) X= 539764.26 Y= 4404324.66 NAD 83 (corners) UTM ZONE 12N
 Legal T _____, R _____, Sec _____, _____ 1/4, _____ 1/4 or Lat _____, Long _____ or UTM Coord _____
 Size of Evaluation Area _____ Photo(s) Taken Yes No _____
 Observer(s) Olmstead, Wimmer, Zuehlke Date 6/24/08
 Ecological Site _____ Soil Map Unit Name _____

Soil/Site Verification

Rangeland Ecological Site Description and/or Soil Survey _____ Area of Interest Determination _____
 Surface Texture _____ Surface Texture _____
 Depth: Very Shallow Shallow Moderate Deep Depth: Very Shallow Shallow Moderate Deep
 (<10") (10"-20") (20"-40") (>40") (<10") (10"-20") (20"-40") (>40")
 List diagnostic horizons in profile and depth List diagnostic horizons in profile and depth
 1 _____ 3 _____ 1 _____ 3 _____
 2 _____ 4 _____ 2 _____ 4 _____

Parent Material _____ Slope 2-5 % Elevation _____ ft Topographic Position _____ Aspect S

Avg Annual Precip 8"-10" Recent Weather (last 2 years) Drought Normal Wet _____

Describe wildlife and livestock use and recent disturbances recent cattle use - moderate to heavy (in spots)

Describe offsite influences on area of interest rd to south

Part 2. Indicator Rating

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
S,H	1. Rills					✓
Comments:						
S,H	2. Water Flow Patterns				✓	
Comments:						
S,H	3. Pedestals and/or Terracettes					✓
Comments:						
S,H	4. Bare Ground					✓
Comments:						
S,H	5. Gullies					✓
Comments:						
S	6. Wind-Scoured, Blowouts, and/or Deposition Areas					✓
Comments:						

Part 2. Indicator Rating (continued)

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
H	7. Litter Movement					✓
Comments:						
S,H,B	8. Soil Surface Resistance to Erosion					✓
Comments:						
S,H,B	9. Soil Surface Loss or Degradation					✓
Comments:						
H	10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					✓
Comments:						
S,H,B	11. Compaction Layer					✓
Comments:						
B	12. Functional/Structural Groups					✓
Comments:						
B	13. Plant Mortality/Decadence				✓	
Comments:						
H,B	14. Litter Amount				✓	
Comments:						
B	15. Annual Production					✓
Comments:						
B	16. Invasive Plants				✓	
Comments:						
B	17. Reproductive Capability of Perennial Plants					✓
Comments:						

Part 3. Summary

A. Indicator Summary

Departure from Ecological Site Description/
Ecological Reference Area(s)

Rangeland Health Attributes		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	Σ
S	Soil/Site Stability (Indicators 1-6, 8, 9 & 11)				I	III	9
H	Hydrologic Function (Indicators 1-5, 7-11 & 14)				II	III	11
B	Biotic Integrity (Indicators 8-9 & 11-17)				III	I	9

B. Attribute Summary - Check the category that best fits the "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings in the preceding Indicator Summary table.

Attribute	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability Rationale:					✓
Hydrologic Function Rationale:					✓
Biotic Integrity Rationale:					✓

Cover Worksheet

State Ut Office 080 Ecological Site _____
 Observer(s) Oliverstead, Wainman, Zuretying Date 4/24/08 Site ID AR2

LIFE FORMS ¹	COVER CLASSES (% Canopy)							
	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Grass								
Annual			✓					
Native Perennial				✓				
Exotic Perennial		✓						
II - Forb								
Annual		✓						
Perennial			✓					
III - Shrub							✓	
IV - Tree					✓			
V - Succulent		✓						
VI - Biological Crust		✓						
% GROUND COVER²	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Vascular Plants								✓
II - Standing Dead Vegetation			✓					
III - Litter (in contact with the soil surface)			✓					
IV - Biological Crust		✓						
V - Rock/Gravel		✓						
VI - Bare Ground				✓				

¹ **Life Forms Cover** - Record multiple canopy cover classes; total plant canopy may exceed 100%. Small openings (less than 2" in diameter) are included as cover.

² **Ground Cover** - Category I is an estimate of total vascular plant cover; overlapping canopies are counted as only **one** canopy (record life form with first point of contact). Total vascular plant cover (I) together with the sum of cover in Categories II-VI should total to approximately 100%.

Notes: Include source of cover data (e.g., estimates or measurements)

Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using cover or weight .

Dominant Species on Site

- 1 Wyo. big sagebrush
- 2 rubber rabbitbrush
- 3 western wheatgrass
- 4 _____

Noxious Weeds

- 1 horsetail tongue
- 2 thistle spp. ?
- 3 _____

Invasive Natives increasers

- 1 Utah juniper
- 2 Rocky mountain juniper
- 3 rubber rabbitbrush

Invasive Exotics

- 1 cheatgrass
- 2 Kentucky bluegrass *
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Functional/Structural Groups Worksheet

State Ut Office 080 Ecological Site _____ Site ID AR 2
 Observer(s) Olsonstead, Wimmer, Zwetzig Date 6/24/08

Functional/Structural Groups			Species List for Functional/Structural Groups	
	Name	Potential ¹	Actual ²	Plant Names
T	A. grasses	<u>cheatgrass</u>	<u>III</u>	
S-M	P. grasses	<u>western wheat</u>	<u>III III III</u>	<u>sandberg's blizzard</u> <u>Kentucky blizzard</u> <u>smooth bromes</u> <u>Indian rice grass</u>
	unknown w/ rice grass	<u>squirrel tail</u>	<u>III III III</u>	<u>Russian wildrye</u> <u>prairie junegrass</u>
T	A. forbs	<u>houndstongue</u>	<u>(salsify) triquetron</u>	<u>annual mustard</u> <u>thistle</u>
M	P. forbs	<u>scarlet gilia</u>	<u>(salsify) globe mallow</u>	<u>Indian paintbrush</u> <u>Cryptantha spp</u> <u>biscuit root</u>
		<u>Senecio spp</u> <u>penstemon</u>	<u>Yarrow</u>	<u>antelope bitterbrush</u> <u>mullein</u> <u>dandelion</u> <u>unknown</u>
		<u>false dandelion</u>		
D	Struct.	<u>rubber rabbitbrush</u>	<u>III I</u>	<u>Wybig sage</u> <u>snowberry</u>
			<u>III III</u>	<u>II</u>
			<u>III III</u>	<u>II</u>
T	succulents	<u>Opuntia</u>		
M	trees	<u>Utah juniper</u>	<u>III</u>	<u>Pinon pine</u> <u>Rocky Mtn Juniper</u>
	Biological Crust ³	<u>grass-like</u> <u>elk sedge</u>		<u>III</u>

Indicate whether each "structural/functional group" is a Dominant (D) (roughly 41-100% composition), a Subdominant (S) (roughly 11-40% composition), a Minor Component (M) (roughly 3-10% composition), or a Trace Component (T) (<3% composition) based on weight or cover composition in the area of interest (e.g., "Actual²" column) relative to the "Potential" column derived from information found in the ecological site description and/or at the ecological reference area

Biological Crust³ dominance is evaluated solely on cover not composition by weight.

<u>bare ground</u>	<u>litter</u>	<u>rock</u>	<u>standing dead</u>	<u>crypt</u>
<u>III III III</u>	<u>III III</u>	<u>I</u>	<u>III</u>	<u>I</u>
<u>II</u>	<u>III III</u>			

Rangeland Health Indicator Evaluation Matrix

State _____ Office _____ Ecological Site _____ Site ID _____

If indicator(s) revised - Observer(s) _____ Date _____

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills (Default Descriptor)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
1. Rills (Revised Descriptor)					✓
2. Water Flow Patterns (Default Descriptor)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
2. Water Flow Patterns (Revised Descriptor)				✓	
3. Pedestals and/or Terracettes (Default Descriptor)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns and/or on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.
3. Pedestals and/or Terracettes (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground (Default Descriptor)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderately to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally match that expected for the site.
4. Bare Ground (Revised Descriptor)					✓
5. Gullies (Default Descriptor)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon with vegetation stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
5. Gullies (Revised Descriptor)					✓
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Default Descriptor)	Extensive.	Common.	Occasionally present.	Infrequent and few.	Matches what is expected for the site.
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
7. Litter Movement (wind or water) (Default Descriptor)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
7. Litter Movement (wind or water) (Revised Descriptor)					✓
8. Soil Surface Resistance to Erosion (Default Descriptor)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
8. Soil Surface Resistance to Erosion (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default Descriptor)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded than, that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.
9. Soil Surface Loss or Degradation (Revised Descriptor)					✓
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Default Descriptor)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
11. Compaction Layer (below soil surface) (Default Descriptor)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread; moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal; not restrictive to water movement and root penetration.
11. Compaction Layer (below soil surface) (Revised Descriptor)					✓
12. Functional/ Structural Groups (F/S Groups) (Default Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)	Number of F/S groups greatly reduced; and/or relative dominance of F/S groups has been dramatically altered; and/or number of species within F/S groups dramatically reduced.	Number of F/S groups reduced; and/or one dominant group and/or one or more subdominant groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced; and/or one or more subdominant F/S groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced; and/or relative dominance of F/S groups has been modified from that expected for the site; and/or number of species within F/S groups slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
12. Functional/ Structural Groups (F/S Groups) (Revised Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)					✓

Rangeland Health Indicator Evaluation Matrix

[continued]

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
13. Plant Mortality/Decadence (Default Descriptor)	Dead and/or decadent plants are common.	Dead and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
13. Plant Mortality/Decadence (Revised Descriptor)				✓ <i>all eye claw sage brush</i>	
14. Litter Amount (Default Descriptor)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
14. Litter Amount (Revised Descriptor)				✓ <i>slight</i>	
15. Annual Production (Default Descriptor)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
15. Annual Production (Revised Descriptor)					✓
16. Invasive Plants (Default Descriptor)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily on disturbed sites.	Rarely present on the site.
16. Invasive Plants (Revised Descriptor)				✓	

Rangeland Health Indicator Evaluation Matrix

(concluded)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive Capability of Perennial Plants (native or seeded) (Default Descriptor)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions.
17. Reproductive Capability of Perennial Plants (native or seeded) (Revised Descriptor)					✓

Record rating (1-6) in shaded cells. Cells are arranged in 3 x 6 pattern of typical kit (see diagram)

Loc	Surface			1 inch			Loc	Surface			1 inch			Loc	Surface			1 inch		
	In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#
	0:00	5:00	3	0:45	5:45	3		1:30	6:30	3	2:15	7:15	3		3:00	8:00	2	3:45	8:45	1
	0:15	5:15	3	1:00	6:00	3		1:45	6:45	2	2:30	7:30	2		3:15	8:15	2	4:00	9:00	1
	0:30	5:30	3	1:15	6:15	3		2:00	7:00	2	2:45	7:45	2		3:30	8:30	2	4:15	9:15	1

15
13
13
41

"Loc" is location (e.g., location along a line transect if used). It is optional.

Samples should be less than 1/4" in diameter and less than 1/8" thick.

"Surface" is soil surface sample. "1 inch" is removed from soil 3/4 - 1" below surface.

2.27

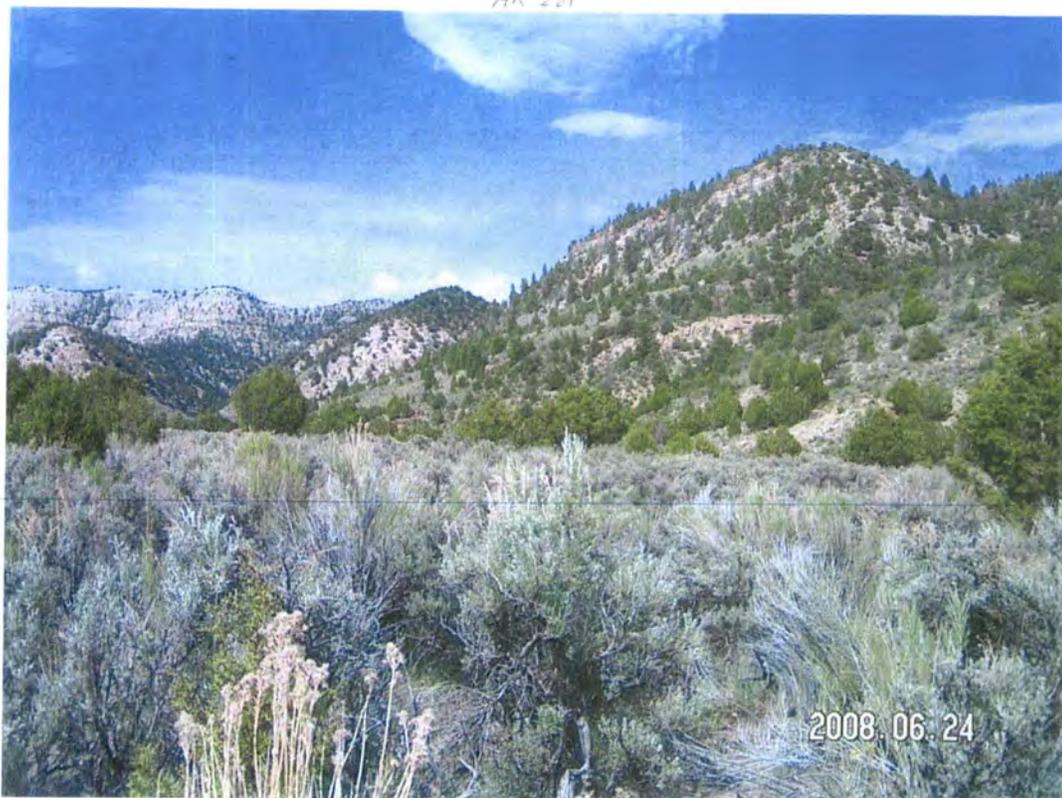
Table 1. Soil Stability Evaluation for 1/4"-diameter Air-Dry Samples

ALWAYS Sieve Soils (even if rated ≤ 3) to Verify Class

Stability class	Criteria for assignment to stability class (for Standard Characterization)*
0	Soil too unstable to sample (falls through sieve)*.
1	50% of structural integrity lost within 5 seconds of insertion in water.
2	50% of structural integrity lost 5-30 seconds after insertion.
3	50% of structural integrity lost 30-300 seconds after insertion or <10% of soil remains on sieve after 5 dipping cycles.
4	10 - 25% of soil remains on sieve after 5 dipping cycles.
5	25 - 75% of soil remains on sieve after 5 dipping cycles.
6	75 - 100% of soil remains on sieve after 5 dipping cycles.

* If too unstable to sample, try gently wetting with a mister (perfume bottle available at drug stores), remove sample, and allow to air-dry before testing.

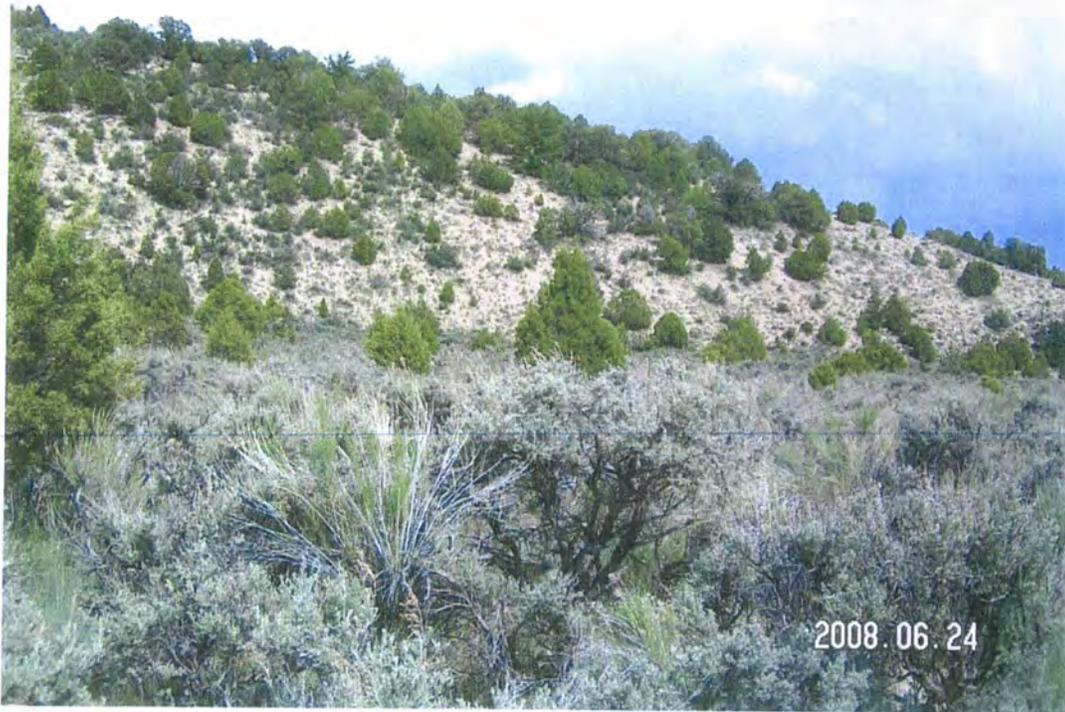
AK 2a



AK 2b



AK24



AK24



LC 1d



Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation (Bold items require completion, other information is optional)

State Ut Office D80 Management Unit Lears Canyon
 Pasture/Watershed _____ ID# LC 1 Major Land Resource Area _____
 Location (description) X = 546114.76 Y = 4410394.25 NAD 83 (cornus) UTM Zone 12N
 Legal T _____, R _____, Sec _____, _____ 1/4, _____ 1/4 or Lat _____, Long _____ or UTM Coord _____
 Size of Evaluation Area 10 acres Photo(s) Taken Yes No _____
 Observer(s) Day, Almatrad, Wimmer, Zuehlke Date 6/19/08
 Ecological Site _____ Soil Map Unit Name _____

Soil/Site Verification

Rangeland Ecological Site Description and/or Soil Survey _____ Area of Interest Determination _____
 Surface Texture _____ Surface Texture _____
 Depth: Very Shallow Shallow Moderate Deep Depth: Very Shallow Shallow Moderate Deep
 (<10") (10"-20") (20"-40") (>40") (<10") (10"-20") (20"-40") (>40")
 List diagnostic horizons in profile and depth _____ List diagnostic horizons in profile and depth _____
 1 _____ 3 _____ 1 _____ 3 _____
 2 _____ 4 _____ 2 _____ 4 _____

Parent Material _____ Slope 5-10% Elevation _____ ft Topographic Position _____ Aspect S
 Avg Annual Precip ~~8"-10"~~ Recent Weather (last 2 years) Drought 107 Normal 108 Wet _____

Describe wildlife and livestock use and recent disturbances current livestock use, all fides use

Describe offsite influences on area of interest sol to the south, lg. drainage in bottom

Part 2. Indicator Rating

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
S,H	1. Rills					✓
Comments:						
S,H	2. Water Flow Patterns					✓
Comments:						
S,H	3. Pedestals and/or Terracettes					✓
Comments:						
S,H	4. Bare Ground					✓
Comments:						
S,H	5. Gullies					✓
Comments:						
S	6. Wind-Scoured, Blowouts, and/or Deposition Areas					✓
Comments:						

LC 1 - small site

A grasses
cheatgrass
|||

P. grasses
western wheatgrass Indian ricegrass smooth brome squirrel tail Kentucky bluegrass
||||

Sporobolus airoides

A forbs
roundstemon luteoed
| |||

P. forbs ^{Rocky Mtn}
Penstemon ~~spp~~ scarlet gilia Cryptantha Eriogonum spp. Indian paintbrush
mat penstemon columbine dandelion burdock blue flax shrubby buckwheat

shrubs
||| big sage | white rabbitbrush shunkbrush gum lesser snowweed snowberry green rabbitbrush
||| ||| ||| |||
wild rose

trees
H. juniper narrowleaf cottonwood

succulents
(none)

bare ground litter rock sandwich dead Crochets Moss
||| | ||| | |

Cover Worksheet

State UT Office 080 Ecological Site _____
 Observer(s) Dan Olmstead, Wimmer, Zwetzig Date 6/19/08 Site ID LC-1

LIFE FORMS ¹	COVER CLASSES (% Canopy)							
	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Grass								
Annual			✓					
Native Perennial				✓				
Exotic Perennial		✓						
II - Forb								
Annual			✓					
Perennial			✓					
III - Shrub								
							✓	
IV - Tree								
			✓					
V - Succulent								
	✓	✓						
VI - Biological Crust								
				✓				
% GROUND COVER ²	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Vascular Plants								
								✓
II - Standing Dead Vegetation								
				✓				
III - Litter (in contact with the soil surface)								
				✓				
IV - Biological Crust								
				✓				
V - Rock/Gravel								
			✓					
VI - Bare Ground								
			✓					

¹ **Life Forms Cover** - Record multiple canopy cover classes; total plant canopy may exceed 100%. Small openings (less than 2" in diameter) are included as cover.

² **Ground Cover** - Category I is an estimate of total vascular plant cover; overlapping canopies are counted as only **one** canopy (record life form with first point of contact). Total vascular plant cover (I) together with the sum of cover in Categories II-VI should total to approximately 100%.

Notes: Include source of cover data (e.g., estimates or measurements)

Functional/Structural Groups Worksheet

State Ut Office 080 Ecological Site _____ Site ID LC1
 Observer(s) Wendy Williams Zwetzig Date 6/19/2008

Functional/Structural Groups			Species List for Functional/Structural Groups
Name	Potential ¹	Actual ²	Plant Names
<i>annual grasses</i>		<i>M</i>	<i>see back sheet</i>
<i>perennial grasses</i>		<i>S-M</i>	↓
<i>annual forbs</i>		<i>M-T</i>	
<i>perennial forbs</i>		<i>M-T</i>	
<i>shrubs</i>		<i>D</i>	
<i>trees</i>		<i>S-M</i>	
Biological Crust ³			

Indicate whether each "structural/functional group" is a **Dominant (D)** (roughly 41-100% composition), a **Subdominant (S)** (roughly 11-40% composition), a **Minor Component (M)** (roughly 3-10% composition), or a **Trace Component (T)** (<3% composition) based on weight or cover composition in the area of interest (e.g., "Actual²" column) relative to the "Potential¹" column derived from information found in the ecological site description and/or at the ecological reference area.

Biological Crust³ dominance is evaluated solely on **cover** not composition by weight.

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground (Default Descriptor)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderately to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally match that expected for the site.
4. Bare Ground (Revised Descriptor)					✓
5. Gullies (Default Descriptor)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon with vegetation stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
5. Gullies (Revised Descriptor)					✓
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Default Descriptor)	Extensive.	Common.	Occasionally present.	Infrequent and few.	Matches what is expected for the site.
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default Descriptor)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded than, that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.
9. Soil Surface Loss or Degradation (Revised Descriptor)					✓
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Default Descriptor)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
13. Plant Mortality/Decadence (Default Descriptor)	Dead and/or decadent plants are common.	Dead and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
13. Plant Mortality/Decadence (Revised Descriptor)			✓	✓	
14. Litter Amount (Default Descriptor)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
14. Litter Amount (Revised Descriptor)			✓		
15. Annual Production (Default Descriptor)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
15. Annual Production (Revised Descriptor)					✓
16. Invasive Plants (Default Descriptor)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily on disturbed sites.	Rarely present on the site.
16. Invasive Plants (Revised Descriptor)			✓		

Record rating (1-6) in shaded cells. Cells are arranged in 3 x 6 pattern of typical kit (see diagram)

Loc	Surface			1 inch			Loc	Surface			1 inch			Loc	Surface			1 inch			
	In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#	
	0:00	5:00	3	0:45	5:45	3		1:30	6:30	1	2:15	7:15	2		3:00	8:00	3	3:45	8:45	1	13
	0:15	5:15	3	1:00	6:00	3		1:45	6:45	1	2:30	7:30	2		3:15	8:15	2	4:00	9:00	1	12
	0:30	5:30	1	1:15	6:15	3		2:00	7:00	1	2:45	7:45	1		3:30	8:30	3	4:15	9:15	1	10 35

"Loc" is location (e.g., location along a line transect if used). It is optional.

Samples should be less than 1/4" in diameter and less than 1/8" thick.

"Surface" is soil surface sample. "1 inch" is removed from soil 3/4 - 1" below surface.

~ 2

Table 1. Soil Stability Evaluation for 1/4"-diameter Air-Dry Samples

ALWAYS Sieve Soils (even if rated ≤ 3) to Verify Class	
Stability class	Criteria for assignment to stability class (for Standard Characterization)*
0	Soil too unstable to sample (falls through sieve)*.
1	50 % of structural integrity lost within 5 seconds of insertion in water.
2	50 % of structural integrity lost 5—30 seconds after insertion.
3	50 % of structural integrity lost 30—300 seconds after insertion or <10% of soil remains on sieve after 5 dipping cycles.
4	10 - 25% of soil remains on sieve after 5 dipping cycles.
5	25 - 75% of soil remains on sieve after 5 dipping cycles.
6	75 - 100% of soil remains on sieve after 5 dipping cycles.

* If too unstable to sample, try gently wetting with a mister (perfume bottle available at drug stores), remove sample, and allow to air-dry before testing.

Rangeland Health Indicator Evaluation Matrix

(concluded)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive Capability of Perennial Plants (native or seeded) (Default Descriptor)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions.
17. Reproductive Capability of Perennial Plants (native or seeded) (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
11. Compaction Layer (below soil surface) (Default Descriptor)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread; moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal; not restrictive to water movement and root penetration.
11. Compaction Layer (below soil surface) (Revised Descriptor)					✓
12. Functional/ Structural Groups (F/S Groups) (Default Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)	Number of F/S groups greatly reduced; and/or relative dominance of F/S groups has been dramatically altered; and/or number of species within F/S groups dramatically reduced.	Number of F/S groups reduced; and/or one dominant group and/or one or more subdominant groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced; and/or one or more subdominant F/S groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced; and/or relative dominance of F/S groups has been modified from that expected for the site; and/or number of species within F/S groups slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
12. Functional/ Structural Groups (F/S Groups) (Revised Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)				✓ <i>old eye class size</i>	

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
7. Litter Movement (wind or water) (Default Descriptor)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
7. Litter Movement (wind or water) (Revised Descriptor)					✓
8. Soil Surface Resistance to Erosion (Default Descriptor)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
8. Soil Surface Resistance to Erosion (Revised Descriptor)					✓ (2)

Rangeland Health Indicator Evaluation Matrix

State Ut Office 080 Ecological Site _____ Site ID LC1
 If indicator(s) revised - Observer(s) Day, Olmstead, Wimmer, Zuckey Date 6/19/08

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills (Default Descriptor)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
1. Rills (Revised Descriptor)					✓
2. Water Flow Patterns (Default Descriptor)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
2. Water Flow Patterns (Revised Descriptor)					✓
3. Pedestals and/or Terracettes (Default Descriptor)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns and/or on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.
3. Pedestals and/or Terracettes (Revised Descriptor)					✓

Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using ^{est}cover or weight .

Dominant Species on Site

- 1 Basin big sagebrush
- 2 squirrel tail
- 3 Ut juniper
- 4 _____

Noxious Weeds

- 1 houndstongue
- 2 burdock
- 3 _____

Invasive Natives *Increasers*

- 1 Ut juniper
- 2 _____
- 3 _____

Invasive Exotics

- 1 cheatgrass
- 2 _____
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Part 2. Indicator Rating (continued)

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
H	7. Litter Movement					✓
Comments:						
S,H,B	8. Soil Surface Resistance to Erosion					✓
Comments:						
S,H,B	9. Soil Surface Loss or Degradation					✓
Comments:						
H	10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					✓
Comments:						
S,H,B	11. Compaction Layer					✓
Comments:						
B	12. Functional/Structural Groups				✓	
Comments:						
B	13. Plant Mortality/Decadence			✓		
Comments:						
H,B	14. Litter Amount			✓		
Comments:						
B	15. Annual Production				✓	✓
Comments:						
B	16. Invasive Plants			✓		
Comments:						
B	17. Reproductive Capability of Perennial Plants					✓
Comments:						

Part 3. Summary

Departure from Ecological Site Description/
Ecological Reference Area(s)

A. Indicator Summary

Rangeland Health Attributes		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	Σ
S	Soil/Site Stability (Indicators 1-6, 8, 9 & 11)						9
H	Hydrologic Function (Indicators 1-5, 7-11 & 14)						11
B	Biotic Integrity (Indicators 8-9 & 11-17)						9

B. Attribute Summary - Check the category that best fits the "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings in the preceding Indicator Summary table.

Attribute	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability Rationale:					✓
Hydrologic Function Rationale:					✓
Biotic Integrity Rationale:				✓	

LC1A



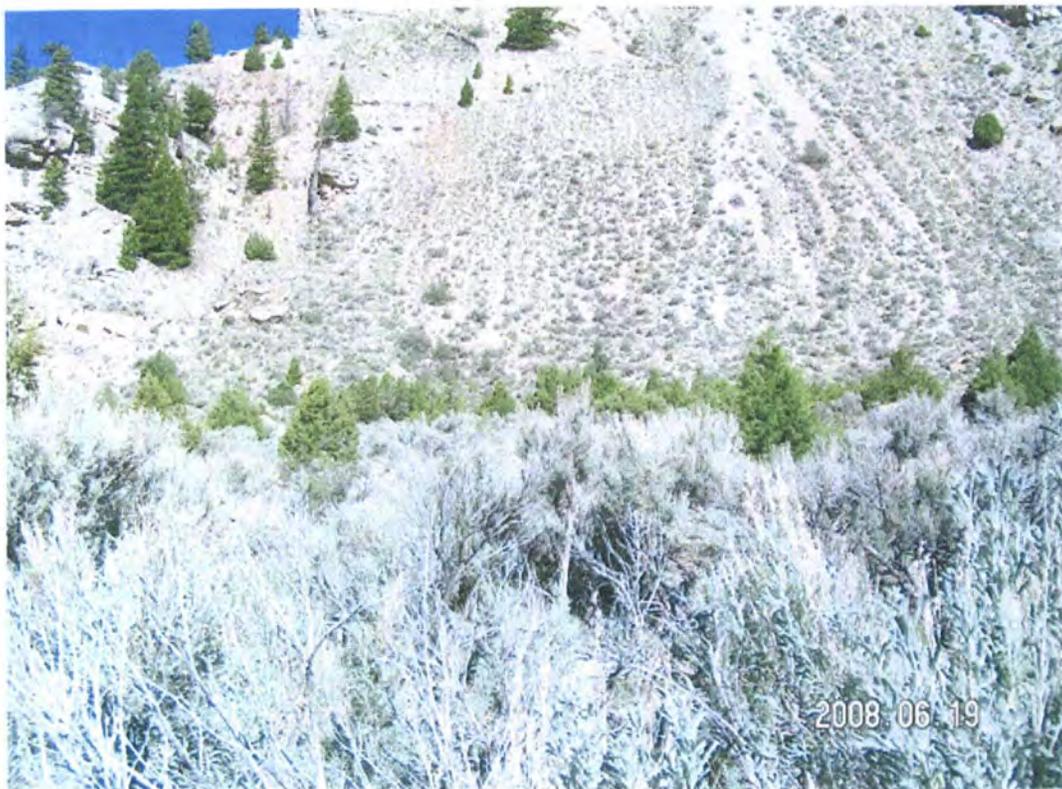
LC1B



LC 12



LC 14



Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using ^{est}cover or weight .

Dominant Species on Site

- 1 Basin big sagebrush
- 2 squirrel tail
- 3 ~~cedar~~ lt juniper
- 4 _____

Noxious Weeds

- 1 chondrostemon
- 2 burdock
- 3 _____

Invasive Natives *Increasers*

- 1 lt. juniper
- 2 _____
- 3 _____

Invasive Exotics

- 1 cheatgrass
- 2 _____
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Evaluation Sheet (Front)

5-17-13
Learys Canyon #1

Aerial Photo: _____

Management Unit: LC#1 State: VT Office: VFO 080 Range/Ecol. Site Code: _____
(Allotment or pasture)

Ecological Site Name: _____ Soil Map Unit/Component Name: _____

Observers: Jade Jensen, Alec Bryan Date: _____

Location (description): 0546120, 4410418

T. _____ R. _____ or _____ N. Lat. Or UTM E _____ m Position by GPS / N
UTM Zone _____ Datum _____

Sec. _____ W. Long. _____ N _____ m Photos taken? N

Size of evaluation area: 100 m x 100 m

Composition (Indicators 10 and 12) based on: _____ Annual Production, _____ Cover Produced During Current Year or _____ Biomass

Soil/site verification:

Range/Ecol. Site Descr., Soil Surv., and/or Ecol. Ref. Area:

Evaluation Area:

Surface texture _____

Surface texture _____

Depth: very shallow _____ shallow _____ moderate _____ deep _____

Depth: very shallow _____ shallow _____ moderate _____ deep _____

Type and depth of diagnostic horizons:

Type and depth of diagnostic horizons:

1. _____ 3. _____

1. _____ 3. _____

2. _____ 4. _____

2. _____ 4. _____

Surf. Efferv.: none _____ v. slight _____ slight _____ strong _____ violent _____

Surf. Efferv.: none _____ v. slight _____ slight _____ strong _____ violent _____

Parent material _____ Slope _____ % Elevation _____ ft.

Topographic position _____ Aspect _____

Average annual precipitation _____ inches

Seasonal distribution _____

Recent weather (last 2 years) (1) drought _____, (2) normal _____, or (3) wet _____.

Wildlife use, livestock use (intensity and season of allotted use), and recent disturbances:

wildlife - old livestock - no real recent disturbance

Off-site influences on evaluation area: None

Criteria used to select this particular evaluation area as REPRESENTATIVE (specific info. and factors considered; degree of "representativeness")

prior site

Other remarks (continue on back if necessary) Heavy Sagebrush ESP

Reference: (1) Reference Sheet: _____; Author: AB JJ; Creation Date: 5-17-13
or (2) Other (e.g., name and date of ecological site description; locations of ecological reference area(s)) _____

Reference Sheet

Author(s)/participant(s): _____

Contact for lead author: _____

Date: _____ MLRA: _____ Sub-MLRA: _____ Ecological Site: _____ 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: ___Annual 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 and natural disturbance regimes for each community within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. Number and extent of rills: See Page 2 One gullie from
2. Presence of water flow patterns: Natural run-off
3. Number and height of erosional pedestals or terracettes: _____
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are **not** bare ground): _____
5. Number of gullies and erosion associated with gullies: _____
6. Extent of wind scoured, blowouts and/or depositional areas: _____
7. Amount of litter movement (describe size and distance expected to travel): _____
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): _____
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): _____
10. Effect of plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: _____
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): _____
12. Functional/Structural Groups (list in order of descending dominance by above-ground production or live foliar cover (specify using symbols: >>, >, = to indicate much greater than, greater than, and equal to; place dominants, subdominants and "others" on separate lines):
 Dominants: _____
 Sub-dominants: _____
 Other: _____
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): _____
14. Average percent litter cover (_____ %) and depth (_____ inches). _____
15. Expected annual production (this is TOTAL above-ground production, not just forage production):
 _____ lbs./acre or kg/ha (choose one)
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 indicators, we are describing what is NOT expected in the reference state for the ecological site.: _____
17. Perennial plant reproductive capability: _____

Departure from Reference Sheet

Indicator*	Extreme to Total	Moderate to Extreme	Moderate	Slightly to Moderate	None to Slight
7. Litter Movement (wind or water)					Reference Sheet:
Generic Descriptor	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
8. Soil Surface Resistance to Erosion					Reference Sheet:
Generic Descriptor	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
9. Soil Surface Loss or Degradation					Reference Sheet:
Generic Descriptor	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded, than that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for site.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Evaluation Matrix

State _____ Office _____ Ecological Site _____ Site ID _____

Authors _____ Revision Date _____

Departure from Reference Sheet

Indicator*	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills _____					Reference Sheet: _____ ✓
Generic Descriptor	Rill formation is severe and well defined throughout most of the site.	Rill formation is moderately active and well defined throughout most of the site.	Active rill formation is slight at infrequent intervals; mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
2. Water Flow Patterns _____					Reference Sheet: _____ ✓
Generic Descriptor	Water flow patterns extensive and numerous; unstable with active erosion; usually connected.	Water flow patterns more numerous and extensive than expected; deposition and cut areas common; occasionally connected.	Number and length of water flow patterns nearly match what is expected for the site; erosion is minor with some instability and deposition.	Number and length of water flow patterns match what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
3. Pedestals and/or Terracettes _____					Reference Sheet: _____ ✓
Generic Descriptor	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestaled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestaled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns on exposed slopes.	Current or past evidence of pedestaled plants or rocks as expected for the site. Terracettes absent or uncommon.

Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

Indicator	Extreme to Moderate	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
12. Functional/ Structural Groups (F/S Groups) See Functional/ Structural Groups Worksheet					Reference Sheet: 
Generic Descriptor	Number of F/S groups greatly reduced and/or Relative dominance of F/S groups has been dramatically altered and/or Number of species within F/S groups dramatically reduced.	Number of F/S groups reduced and/or One dominant group and/or one or more sub-dominant group replaced by F/S groups not expected for the site and/or Number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced and/or One or more sub-dominant F/S groups replaced by F/S groups not expected for the site and/or Number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced and/or Relative dominance of F/S groups has been modified from that expected for the site and/or number of species within F/S slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
13. Plant Mortality/ Decadence					Reference Sheet: 
Generic Descriptor	Dead and/or decadent plants are common.	Dead plants and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence match that expected for the site.
14. Litter Amount					Reference Sheet: 
Generic Descriptor	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

	None to Slight	Minor to Moderate	Moderate to Significant	Significant	Major to Extreme	None to Slight
15. Annual Production						Reference Sheet: _____ ✓
Generic Descriptor	Less than 20% of potential production for the site based on recent weather.	20-40% of potential production for the site based on recent weather.	40-60% of potential production for the site based on recent weather.	60-80% of potential production for the site based on recent weather.	Exceeds 80% of potential production for the site based on recent weather.	
16. Invasive Plants						Reference Sheet: _____ ✓ in Between BRIE
Generic Descriptor	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily in disturbed areas within the site.	If present, composition of invasive species, matches that expected for the site.	
17. Reproductive Capability of Perennial Plants (native or seeded)						Reference Sheet: _____ ✓
Generic Descriptor	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is moderately reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is slightly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not reduced relative to recent climatic conditions.	

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

Indicator	Extreme to Total	Moderate to Extreme	Moderate	Slightly to Moderate	None to Slight	Reference Sheet:
4. Bare Ground						_____

Generic Descriptor	Much higher than expected for the site. Bare areas are large and generally connected.	Moderate to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas match that expected for the site.	_____
5. Gullies						_____

Generic Descriptor	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate in number to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon, vegetation is stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Match what is expected for the site; drainages are represented as natural stable channels; vegetation common and no signs of erosion.	_____
6. Wind Scoured, Blowout, and/or Depositional Areas						_____

Generic Descriptor	Extensive.	Common.	Occasionally present.	Infrequent and few.	Match what is expected for the site.	_____

in between
 ✓ ——— ✓
 Natural
 carved
 runoff

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

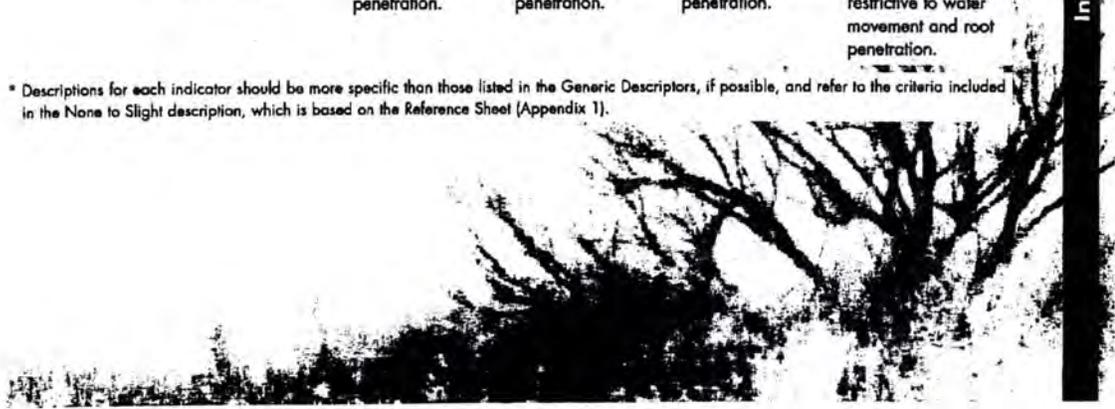
Indicator	Extreme	Adverse	Detrimental	Minor	None to Slight
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					Reference Sheet: _____ ✓

Generic Descriptor	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are not affected by any changes in plant community composition and distribution. Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).
--------------------	--	---	---	--	---

11. Compaction Layer (below soil surface)					Reference Sheet: _____ ✓

Generic Descriptor	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread, moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	Matches that expected for the site; none to minimal, not restrictive to water movement and root penetration.
--------------------	--	--	--	--	--

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).



Reference Sheet (Basic Example*)

Author(s)/participant(s): J. Christensen, B. Call, B. Bestmeyer, R. Placker, D. Trujillo, L. Haysler, D. Coalson, P. Smith & J. Herrick

Contact for lead author: jchristens@web.com/334-556-7890

Date: 03/23/2002 **MLRA:** 52 **Sub-MLRA:** _____ **Ecological Site:** Liny _____ 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: Annual 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 and natural disturbance regimes for each community within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. Number and extent of rills: None

2. Presence of water flow patterns: None, except following extremely high intensity storms, when short (less than 1 m) flow patterns may appear; minimal evidence of past or current soil deposition or erosion.

3. Number and height of erosional pedestals or terracettes: None

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 20 - 30 % bare ground; bare patches should be less than 8-10 inch diameter; occasional 12 inch patches associated with shrubs. Larger bare patches also associated with ant mounds and rodent disturbances

5. Number of gullies and erosion associated with gullies: None

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

7. Amount of litter movement (describe size and distance expected to travel): Minimal and short, associated with water flow patterns following extremely high intensity storms. Litter also may be moved during intense wind storms.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Stability class (Herrick et al. 2001) anticipated to be 5-6 at surface and subsurface under vegetation and 4-5 at surface and subsurface in the interspaces. These values need verification at reference sites.

9. Soil surface structure and SOM content (include type and A-horizon color and thickness): 2-4 inch dark brown A horizon with medium granular structure (Otero County Arnesa series description refers to platy structure, probably not from a true reference site).

10. Effect of plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. High root density of blue grama can limit infiltration. High herbaceous vegetation on this site will result in less rain necessary to sustain this site because more water is retained.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None

12. Functional/Structural Groups (list in order of descending dominance by above-ground production or live cover (specify) using symbols: >>, >, = to indicate much greater than, greater than, and equal to; place dominants, subdominants and "others" on separate lines):
 Dominants: Blue grama > Black grama >
 Sub-dominants: warm season bunchgrasses > Yucca = shrubs >>
 Other: sub-shrubs = succulents; Forbs 0 - 8 % depending on the year.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
 Grasses will nearly always show some mortality and decadence

14. Average percent litter cover (_____ %) and depth (_____ inches). 20 - 25 % litter cover and 0.25 inch depth

15. Expected annual production (this is TOTAL above-ground production, not just forage production):
 _____ #/acre or kg/ha (choose one) 650 to 1200 pounds/acre based on ecological site description. Could be even higher on particularly good years.

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 indicators, we are describing what is NOT expected in the reference state for the ecological site.: Possibly creosote bush which is an invader on similar ecological sites; snakeweed is cyclical, so not regarded as an invasive plant on this ecological site.

17. Perennial plant reproductive capability: all species should be capable of reproducing

*This example includes the absolute minimum information required. Ideally, Reference Sheets should include at least as much information as is included in the "Standard Example" on the next page.

Line-point Intercept Data Form

Page 1 of 1 Shaded cells for calculations
 Plot: LCH Line #: _____ Observer: Jade Jensen Recorder: Alec Bryan
 Direction: N Date: 5-17-13 Intercept (Point) Spacing Interval = _____ cm (____ in)

Pt.	Top canopy	Lower canopy layers			Soil surface	Pt.	Top canopy	Lower canopy layers			Soil surface
		Code 1	Code 2	Code 3				Code 1	Code 2	Code 3	
1	Artrm	Brite				26	Brite	Bluebunch			
2	Artrm	Litter				27	Artrm	Bl Bunch			
3	Artrm	PG				28	Brite	CHVI			
4	Brite	West Wheat				29	Brite	CHVI			
5	Brite	Litter				30	Brite	Artrm			
6	Brite	Litter				31	Brite	POSE			
7	EL	L				32	Brite	Bluebunch			
8	Brite	Bluebunch				33	Artrm	Bluebunch			
9	EL	Western				34	Artrm	Artrm			
10	Brite	Rock				35	Artrm	Bluebunch			
11	Artrm	Bl Bunch				36	POSE	Soil			
12	Brite	POSE				37	AF	Bluebunch			
13	Artrm	Soil				38	West Wheat	Bluebunch			
14	Litter	L				39	Litter	Bluebunch			
15	Brite	Rock				40	BRITE	Soil			
16	Artrm	Rock				41	Rock	Litter			
17	Brite	West Wheat				42	Brite	POSE			
18	Brite	West Wk				43	Brite	Bluebunch			
19	Brite	Bluebunch				44	AF	Artrm			
20	Brite	Bluebunch				45	Juniper	POSE			
21	Brite	Russytes				46	Litter	Bluebunch			
22	POSE	Bluebunch				47	Brite	Litter			
23	Rock	Soil				48	Rock	Soil			
24	Litter	Juniper				49	BRITE	Soil			
25	BRITE	Litter				50	Snowberry	CHVI			

BRTE
 ARTRM
 Western
 Wheat
 = WW
 Pinyon
 Juniper
 Ascp
 Snowberry
 SB
 Embedded
 Litter
 EL
 Doug
 Fir
 Taop
 Panda
 Pose
 Cottonwood
 SWSX
 AF
 Annual
 F

% canopy (foliar) cover = _____ canopy pts (1st col) x 2 = _____ %
 % bare ground* = _____ pts (w/NONE over S) x 2 = _____ %
 % basal cover = _____ plant base pts (last col) x 2 = _____ %

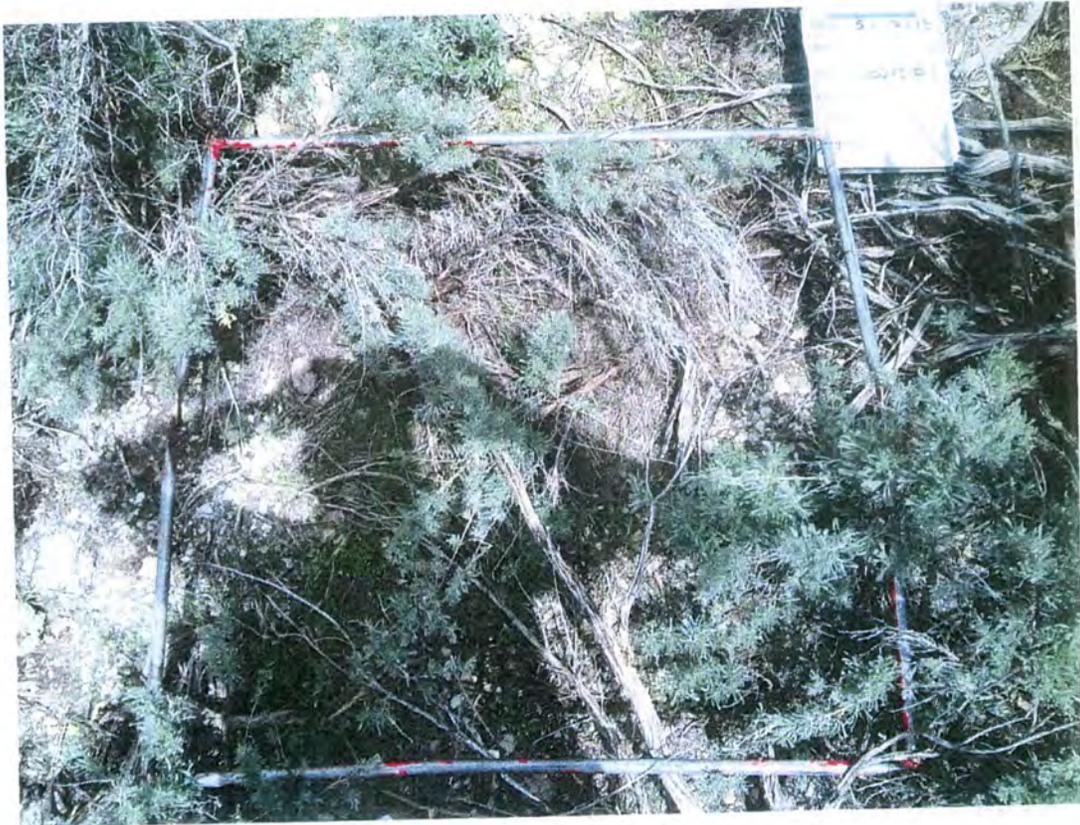
Top canopy codes: Species code, common name, or NONE (no canopy). 57

Lower canopy layers codes: Species code, common name, L (herbaceous litter), W (woody litter, >5 mm (-1/4 in) diameter).

Unknown Species Codes:
 AF# = annual forb
 PF# = perennial forb
 AG# = annual graminoid
 PG# = perennial graminoid
 SH# = shrub
 TR# = tree
Soil Surface (do not use litter):
 Species Code (for basal intercept)
 R = rock fragment (>5 mm (~1/4 in) diameter)
 BR = bedrock, M = moss
 LC = visible lichen crust on soil
 S = soil without any other soil surface code
 EL = embedded litter (see page 10)
 D = duff

*Bare ground occurs ONLY when Top canopy = NONE, lower canopy layers are empty (no L), and Soil surface = S.

5% Rock
 6% Soil
 2% AF
 14% Sagebrush
 25% Cheatgrass
 14% Litter
 26% PG
 2% free
 20
 51 75 81
 23





Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation (Bold items require completion, other information is optional)

State UT Office 080 Management Unit Water Canyon 1

Pasture/Watershed _____ ID# WCI-1 Major Land Resource Area _____

Location (description) 44°15'54.28" N 103°13'24.65" E 8,981.21 ft NAD83 UTM Zone 12N

Legal T _____, R _____, Sec _____, 1/4 _____, 1/4 or Lot _____, long _____ or UTM Coord _____

Size of Evaluation Area _____ Photos Taken Yes No _____

Observer(s) Newberry, Almonstiel, Wimmer, Zumbig Date 6/17/08

Ecological Site _____ Soil Map Unit Name _____

Soil/Site Verification

Rangeland Ecological Site Description and/or Soil Survey _____ Area of Interest Determination _____

Surface Texture _____ Surface Texture _____

Depth: Very Shallow Shallow Moderate Deep Depth: Very Shallow Shallow Moderate Deep

($<10''$) ($10''-20''$) ($20''-40''$) ($>40''$) ($<10''$) ($10''-20''$) ($20''-40''$) ($>40''$)

List diagnostic horizons in profile and depth List diagnostic horizons in profile and depth

1 _____ 3 _____ 1 _____ 3 _____

2 _____ 4 _____ 2 _____ 4 _____

Parent Material _____ Slope 2.7 % Elevation _____ ft Topographic Position _____ Aspect S

Avg Annual Precip 18.2 Recent Weather (last 2 years) Drought 17 Normal 18 Wet _____

Describe wildlife and livestock use and recent disturbances deer & cattle use in the area - some ed

Describe offsite influences on area of interest fire burned over a few yrs. ago - (2003?) - Goodhue Canyon fire

Part 2. Indicator Rating

Attribute	Indicator	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
S,H	1. Rills					✓
Comments:						
S,H	2. Water Flow Patterns					✓
Comments:						
S,H	3. Pedestals and/or Terraces					✓
Comments:						
S,H	4. Bare Ground				✓	
Comments:						
S,H	5. Gullies					✓
Comments:						
S	6. Wind-Scoured, Blowouts, and/or Deposition Areas					✓
Comments:						

Part 2. Indicator Rating (continued)

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
H	7. Litter Movement					✓
Comments:						
S,H,B	8. Soil Surface Resistance to Erosion				✓	
Comments:						
S,H,B	9. Soil Surface Loss or Degradation				✓	
Comments:						
H	10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					✓
Comments:						
S,H,B	11. Compaction Layer					✓
Comments:						
B	12. Functional/Structural Groups				✓	
Comments:						
B	13. Plant Mortality/Decadence		✓			
Comments:						
H,B	14. Litter Amount				✓	
Comments:						
B	15. Annual Production					✓
Comments:						
B	16. Invasive Plants					✓
Comments:						
B	17. Reproductive Capability of Perennial Plants					✓
Comments:						

Part 3. Summary

A. Indicator Summary

Departure from Ecological Site Description/
Ecological Reference Area(s)

Rangeland Health Attributes		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	Σ
S	Soil/Site Stability (Indicators 1-6, 8, 9 & 11)						9
H	Hydrologic Function (Indicators 1-5, 7-11 & 14)						11
B	Biotic Integrity (Indicators 8-9 & 11-17)						9

B. Attribute Summary - Check the category that best fits the "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings in the preceding Indicator Summary table.

Attribute	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability Rationale:					✓
Hydrologic Function Rationale:					✓
Biotic Integrity Rationale:				✓	

Cover Worksheet

State Utah Office 080 Ecological Site _____
 Observer(s) Blunstead, Wilamini Zwetzig Date 6/19/08 Site ID WC1-1

LIFE FORMS ¹	COVER CLASSES (% Canopy)							
	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Grass								
Annual	✓							
Native Perennial			✓					
Exotic Perennial			✓					
II - Forb								
Annual		✓						
Perennial			✓	✓				
III - Shrub								
				✓	✓			
IV - Tree								
					✓			
V - Succulent								
	✓							
VI - Biological Crust								
		✓						
% GROUND COVER ²	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Vascular Plants								
							✓	
II - Standing Dead Vegetation								
				✓				
III - Litter (in contact with the soil surface)								
			✓					
IV - Biological Crust								
		✓						
V - Rock/Gravel								
		✓						
VI - Bare Ground								
				✓				

¹ **Life Forms Cover** - Record multiple canopy cover classes; total plant canopy may exceed 100%. Small openings (less than 2" in diameter) are included as cover.

² **Ground Cover** - Category I is an estimate of total vascular plant cover; overlapping canopies are counted as only **one** canopy (record life form with first point of contact). Total vascular plant cover (I) together with the sum of cover in Categories II-VI should total to approximately 100%.

Notes: Include source of cover data (e.g., estimates or measurements)

Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using ^{Year}cover or weight .

Dominant Species on Site

- 1 snowberry
- 2 unk upon field #1 - early to bell
- 3 woods rose
- 4 _____

Noxious Weeds

- 1 houndstongue
- 2 _____
- 3 _____

Invasive Natives

- 1 _____
- 2 _____
- 3 _____

Invasive Exotics

- 1 ambrosia
- 2 _____
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Rangeland Health Indicator Evaluation Matrix

State UT Office 180 Ecological Site _____ Site ID 41C1-1

If indicator(s) revised - Observer(s) Blumenthal, Whinn, Zwetzig Date 4/19/08

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills (Default Descriptor)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
1. Rills (Revised Descriptor)					✓
2. Water Flow Patterns (Default Descriptor)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
2. Water Flow Patterns (Revised Descriptor)					✓
3. Pedestals and/or Terracettes (Default Descriptor)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns and/or on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.
3. Pedestals and/or Terracettes (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground (Default Descriptor)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderately to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally match that expected for the site.
4. Bare Ground (Revised Descriptor)				✓ <i>check to recent installation</i>	
5. Gullies (Default Descriptor)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon with vegetation stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
5. Gullies (Revised Descriptor)					✓
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Default Descriptor)	Extensive.	Common.	Occasionally present.	Infrequent and few.	Matches what is expected for the site.
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
7. Litter Movement (wind or water) (Default Descriptor)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
7. Litter Movement (wind or water) (Revised Descriptor)					✓
8. Soil Surface Resistance to Erosion (Default Descriptor)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
8. Soil Surface Resistance to Erosion (Revised Descriptor)				✓ reduced below to moderate soil interaction ←	(2)

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default Descriptor)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded than, that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.
9. Soil Surface Loss or Degradation (Revised Descriptor)				<i>✓ wildlife seemed to have temporarily affected soil fertility</i>	
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Default Descriptor)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Revised Descriptor)					<i>✓ recent growth has helped stabilize the site</i>

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
11. Compaction Layer (below soil surface) (Default Descriptor)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread; moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal; not restrictive to water movement and root penetration.
11. Compaction Layer (below soil surface) (Revised Descriptor)					✓
12. Functional/ Structural Groups (F/S Groups) (Default Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)	Number of F/S groups greatly reduced; and/or relative dominance of F/S groups has been dramatically altered; and/or number of species within F/S groups dramatically reduced.	Number of F/S groups reduced; and/or one dominant group and/or one or more subdominant groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced; and/or one or more subdominant F/S groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced; and/or relative dominance of F/S groups has been modified from that expected for the site; and/or number of species within F/S groups slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
12. Functional/ Structural Groups (F/S Groups) (Revised Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)				<i>Succession of site has been shifted back to a mid-seral stage</i>	

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
13. Plant Mortality/Decadence (Default Descriptor)	Dead and/or decadent plants are common.	Dead and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
13. Plant Mortality/Decadence (Revised Descriptor)		✓ due to weather (Drought & Lodge pole)			
14. Litter Amount (Default Descriptor)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
14. Litter Amount (Revised Descriptor)				✓	
15. Annual Production (Default Descriptor)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
15. Annual Production (Revised Descriptor)					✓
16. Invasive Plants (Default Descriptor)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily on disturbed sites.	Rarely present on the site.
16. Invasive Plants (Revised Descriptor)					✓ Kenaf, bluegrass, horseweed

Rangeland Health Indicator Evaluation Matrix
(concluded)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive Capability of Perennial Plants (native or seeded) (Default Descriptor)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions.
17. Reproductive Capability of Perennial Plants (native or seeded) (Revised Descriptor)					✓

201-1d

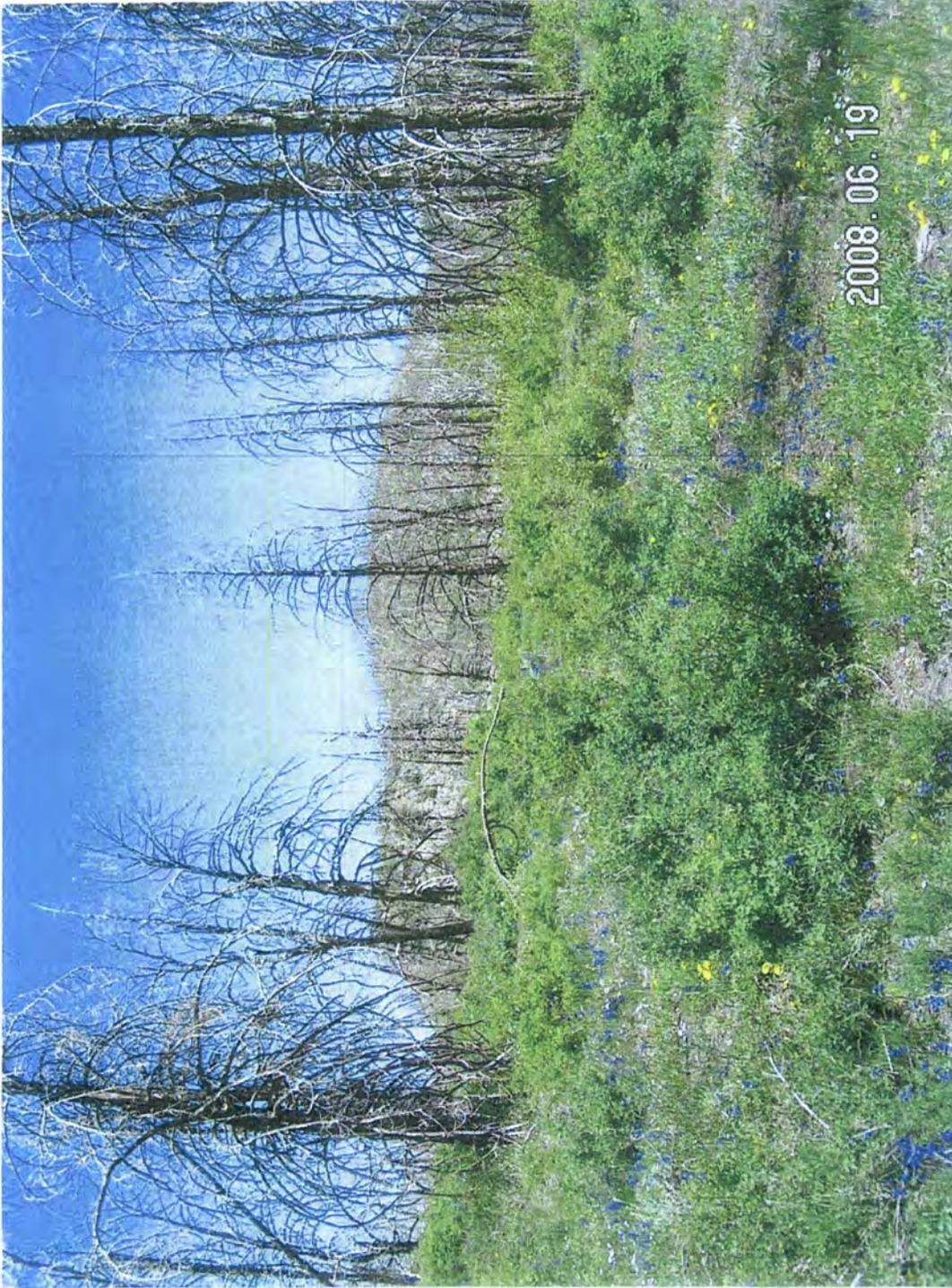


2008.06.19

DC1-1c



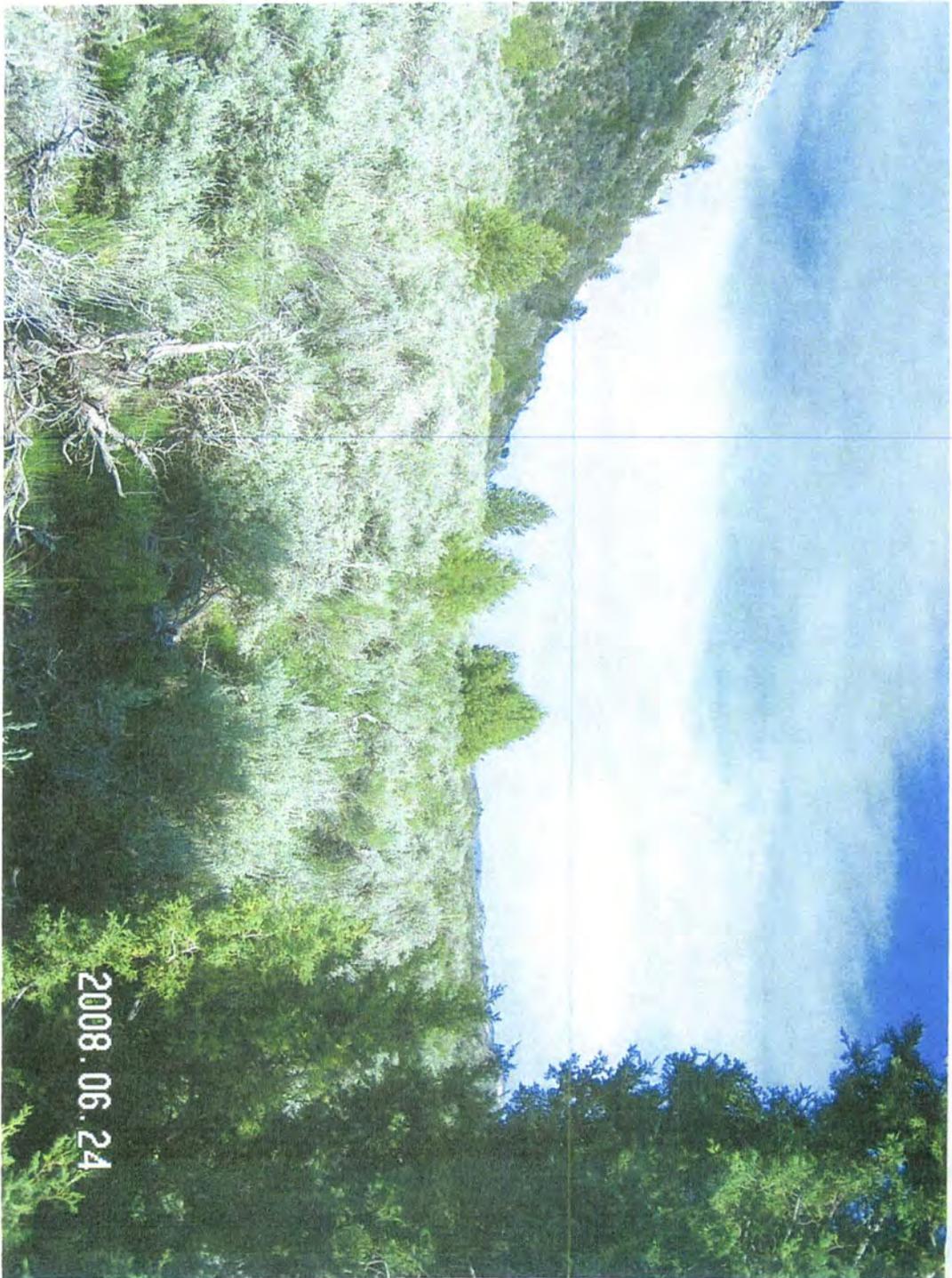
WCT-16





W21-1a

2008.06.19



W21-3c

2008.06.24

Evaluation Sheet (Front)

Aerial Photo: _____

Management Unit: Water Camp #1 State: VT Office: VFO Range/Ecol. Site Code: _____
(Allotment or pasture)

Ecological Site Name: _____ Soil Map Unit/Component Name: Not mapped

Observers: White Bull, Palmer, Jensen, Manaster, ~~Eden~~ Date: 5/16/13

Location (description): _____

T. _____ R. _____ or _____ N. Lat. Or UTM E 053179 m Position by GPS Y / N
UTM Zone 13 Datum 84

Sec. _____ W. Long. N 441554 m Photos taken Y / N

Size of evaluation area: _____

Composition (Indicators 10 and 12) based on: Annual Production, Cover Produced During Current Year or Biomass
all

Soil/site verification:	Evaluation Area:
Range/Ecol. Site Descr., Soil Surv., and/or Ecol. Ref. Area:	Surface texture _____
Surface texture _____	Depth: very shallow _____ shallow _____ moderate _____ deep _____
Depth: very shallow _____ shallow _____ moderate _____ deep _____	Type and depth of diagnostic horizons:
Type and depth of diagnostic horizons:	1. _____ 3. _____
1. _____ 3. _____	2. _____ 4. _____
2. _____ 4. _____	Surf. Efferv.: none _____ v. slight _____ slight _____ strong _____ violent _____
Surf. Efferv.: none _____ v. slight _____ slight _____ strong _____ violent _____	Parent material _____ Slope _____ % Elevation _____ ft. Topographic position _____ Aspect _____
Parent material _____ Slope _____ % Elevation _____ ft.	Average annual precipitation _____ inches Seasonal distribution _____
Average annual precipitation _____ inches	

Recent weather (last 2 years) (1) drought severe 2012, (2) normal _____, or (3) wet severe 2011

Wildlife use, livestock use (intensity and season of allotted use), and recent disturbances:
Light, NEW Aspen growth, FIRE 10 yrs old

Off-site influences on evaluation area:
Late Spring - may ↓ temps, we are on site early.
Cynopterus / Malva baccata

Criteria used to select this particular evaluation area as REPRESENTATIVE (specific info. and factors considered; degree of "representativeness")
Previous plot

Other remarks (continue on back if necessary)

Reference: (1) Reference Sheet: _____; Author: _____; Creation Date: _____
or (2) Other (e.g., name and date of ecological site description; locations of ecological reference area(s)) _____

Evaluation Sheet (Back)

Departure from Expected	Code	Instructions for Evaluation Sheet, Page 2
None to Slight Slight to Moderate Moderate Moderate to Extreme Extreme to Total	N-S S-M M M-E E-T	(1) Assign 17 indicator ratings. If indicator not present, rate None to Slight. (2) In the three grids below, write the indicator number in the appropriate column for each indicator that is applicable to the attribute. (3) Assign overall rating for each attribute based on preponderance of evidence. (4) Justify each attribute rating in writing.
Indicator	Rating	Comments
1. Rills <i>None</i>	S H	
2. Water-flow Patterns <i>None</i>	S H	
3. Pedestals and/or terracettes <i>N</i>	S H	
4. Bare ground <i>19%</i>	S H	
5. Gullies <i>N</i>	S H	
6. Wind-scoured, blowouts, and/or deposition areas <i>NN</i>	S	
7. Litter movement <i>N</i>	S	
8. Soil surface resistance to erosion <i>N</i>	S H B	
9. Soil surface loss or degradation <i>N</i>	S H B	
10. Plant community composition and distribution relative to infiltration <i>N-S</i>	H	<i>Fire impacts</i>
11. Compaction layer <i>N</i>	S H B	
12. Functional/structural groups <i>N/A</i>	B	<i>Post-Fire Communities rebuilding</i>
13. Plant mortality/decadence <i>N-S</i>	B	
14. Litter amount <i>Moderate</i>	H B	
15. Annual production <i>Moderate</i>	B	<i>Late spring</i>
16. Invasive plants <i>moderate</i>	B	<i>Houndstongue</i>
17. Reproductive capability of perennial plants <i>M</i>	B	

Attribute Rating Justification				
Soil & Site Stability:				
E-T	M-E	M	S-M	N-S

S (10 indicators):
Soil & Site Stability
Rating: _____

Attribute Rating Justification				
Hydrologic Function:				
E-T	M-E	M	S-M	N-S

H (10 indicators):
Hydrologic Function
Rating: _____

Attribute Rating Justification				
Biotic Integrity:				
E-T	M-E	M	S-M	N-S

B (9 indicators):
Biotic Integrity
Rating: _____

Interpreting Indicators of Rangeland Health — Technical Reference 1734-6, Version 4

Author(s)/participant(s): AB, DP, Reference Sheet, MM, MWB, JJ
 Contact for lead author: VFD, BLM

Date: _____ MLRA: _____ Sub-MLRA: _____ Ecological Site: _____ 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: Annual 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 and natural disturbance regimes for **each** community within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. Number and extent of rills: _____
2. Presence of water flow patterns: _____
3. Number and height of erosional pedestals or terracettes: _____
4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are **not** bare ground): _____
5. Number of gullies and erosion associated with gullies: _____
6. Extent of wind scoured, blowouts and/or depositional areas: _____
7. Amount of litter movement (describe size and distance expected to travel): _____
8. Soil surface (top few mm) resistance to erosion (stability values are averages – most sites will show a range of values): _____
9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): _____
10. Effect of plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: _____
11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): _____
12. Functional/Structural Groups (list in order of descending dominance by above-ground production or live foliar cover (specify) using symbols: >>, >, = to indicate much greater than, greater than, and equal to; place dominants, subdominants and "others" on separate lines):
 Dominants: _____
 Sub-dominants: _____
 Other: _____
13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): _____
14. Average percent litter cover (_____ %) and depth (_____ inches). _____
15. Expected annual production (this is TOTAL above-ground production, not just forage production):
 _____ - _____ lbs./acre or kg/ha (choose one)
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 indicators, we are describing what is NOT expected in the reference state for the ecological site.: _____
17. Perennial plant reproductive capability: _____

Reference Sheet (Basic Example*)

Author(s)/participant(s): J. Christensen, B. Call, B. Bestelmeyer, R. Blacker, D. Trujillo, L. Hauser, D. Cooleen, P. Smith & J. Herrick

Contact for lead author: jchristensen@wrb.com/334-556-7890

Date: 09/29/2002 **MLRA:** 42 **Sub-MLRA:** _____ **Ecological Site:** Limy _____ 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: Annual 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 and natural disturbance regimes for **each** community within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. Number and extent of rills: None

2. Presence of water flow patterns: None, except following extremely high intensity storms, when short (less than 1 m) flow patterns may appear; minimal evidence of past or current soil deposition or erosion.

3. Number and height of erosional pedestals or terracettes: None

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are **not** bare ground): 20 - 30 % bare ground; bare patches should be less than 8-10 inch diameter; occasional 12 inch patches associated with shrubs. Larger bare patches also associated with ant mounds and rodent disturbances.

5. Number of gullies and erosion associated with gullies: None

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

7. Amount of litter movement (describe size and distance expected to travel): Minimal and short, associated with water flow patterns following extremely high intensity storms. Litter also may be moved during intense wind storms.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Stability class (Herrick et al. 2001) anticipated to be 5-6 at surface and subsurface under vegetation and 4-5 at surface and subsurface in the interspaces. These values need verification at reference sites.

9. Soil surface structure and SOM content (include type and A-horizon color and thickness): 2-4 inch dark brown A horizon with medium granular structure (Otero County Armesa series description refers to platy structure; probably not from a true reference site).

10. Effect of plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. High root density of blue grama can limit infiltration. High herbaceous vegetation on this site will result in less rain necessary to sustain this site because more water is retained.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None

12. Functional/Structural Groups (list in order of descending dominance by above-ground production or live cover (specify) using symbols: >>, >, = to indicate much greater than, greater than, and equal to; place dominants, subdominants and "others" on separate lines):
 Dominants: Blue grama > Black grama >
 Sub-dominants: warm season bunchgrasses > Yucca = shrubs >>
 Other: sub-shrubs = succulents; Forbs 0 - 8 % depending on the year.

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
 Grasses will nearly always show some mortality and decadence

14. Average percent litter cover (_____ %) and depth (_____ inches). 20 - 25 % litter cover and 0.25 inch depth

15. Expected annual production (this is TOTAL above-ground production, not just forage production):
 _____ #/acre or kg/ha (choose one) 650 to 1200 pounds/acre based on ecological site description. Could be even higher on particularly good years.

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 indicators, we are describing what is NOT expected in the reference state for the ecological site.: Possibly creosote bush which is an invader on similar ecological sites; snakeweed is cyclical, so not regarded as an invasive plant on this ecological site.

17. Perennial plant reproductive capability: all species should be capable of reproducing

*This example includes the absolute minimum information required. Ideally, Reference Sheets should include at least as much information as is included in the "Standard Example" on the next page.

Evaluation Matrix

State _____ Office _____ Ecological Site _____ Site ID _____

Authors _____ Revision Date _____

Departure from Reference Sheet

Indicator*	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills _____					Reference Sheet: <input checked="" type="checkbox"/>
Generic Descriptor	Rill formation is severe and well defined throughout most of the site.	Rill formation is moderately active and well defined throughout most of the site.	Active rill formation is slight at infrequent intervals; mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
2. Water Flow Patterns _____					Reference Sheet: <input checked="" type="checkbox"/>
Generic Descriptor	Water flow patterns extensive and numerous; unstable with active erosion; usually connected.	Water flow patterns more numerous and extensive than expected; deposition and cut areas common; occasionally connected.	Number and length of water flow patterns nearly match what is expected for the site; erosion is minor with some instability and deposition.	Number and length of water flow patterns match what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
3. Pedestals and/or Terracettes _____					Reference Sheet: <input checked="" type="checkbox"/>
Generic Descriptor	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestaled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestaled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns on exposed slopes.	Current or past evidence of pedestaled plants or rocks as expected for the site. Terracettes absent or uncommon.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

Indicator	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground				✓	✓
Generic Descriptor	Much higher than expected for the site. Bare areas are large and generally connected.	Moderate to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas match that expected for the site.
5. Gullies					✓
Generic Descriptor	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate in number to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon, vegetation is stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Match what is expected for the site; drainages are represented as natural stable channels; vegetation common and no signs of erosion.
6. Wind Scoured, Blowout, and/or Depositional Areas					✓
Generic Descriptor	Extensive.	Common.	Occasionally present.	Infrequent and few.	Match what is expected for the site.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

Indicator	Extreme to High	Extreme		Slightly Moderate	None to Slight	
7. Litter Movement (wind or water)					Reference Sheet: <u> </u> ✓	
Generic Descriptor	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.		Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
8. Soil Surface Resistance to Erosion					Reference Sheet: <u> </u> ✓	
Generic Descriptor	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.		Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
9. Soil Surface Loss or Degradation					Reference Sheet: <u> </u> ✓	
Generic Descriptor	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded, than that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.		Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for site.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

Indicator	Extreme	Very Extreme	Minor	Slight to Moderate	None to Slight
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					Reference Sheet: _____ ✓

Generic Descriptor	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are not affected by any changes in plant community composition and distribution. Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).
--------------------	--	---	---	--	---

11. Compaction Layer (below soil surface)					Reference Sheet: _____ ✓

Generic Descriptor	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread, moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	Matches that expected for the site; none to minimal, not restrictive to water movement and root penetration.
--------------------	--	--	--	--	--

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).



Departure from Reference Sheet

Indicator	None	Slight	Moderate	Significant	Reference Sheet
12. Functional/ Structural Groups (F/S Groups) See Functional/ Structural Groups Worksheet					✓
Generic Descriptor	Number of F/S groups greatly reduced and/or Relative dominance of F/S groups has been dramatically altered and/or Number of species within F/S groups dramatically reduced.	Number of F/S groups reduced and/or One dominant group and/or one or more sub-dominant group replaced by F/S groups not expected for the site and/or Number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced and/or One or more sub-dominant F/S groups replaced by F/S groups not expected for the site and/or Number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced and/or Relative dominance of F/S groups has been modified from that expected for the site and/or number of species within F/S slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
13. Plant Mortality/ Decadence					✓
Generic Descriptor	Dead and/or decadent plants are common.	Dead plants and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence match that expected for the site.
14. Litter Amount					✓
Generic Descriptor	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Departure from Reference Sheet

	None to Slight	Slight	Moderate	Significant	Reference Sheet
15. Annual Production					Reference Sheet: _____ ✓ See Notes
Generic Descriptor	Less than 20% of potential production for the site based on recent weather.	20-40% of potential production for the site based on recent weather.	40-60% of potential production for the site based on recent weather.	60-80% of potential production for the site based on recent weather.	Exceeds 80% of potential production for the site based on recent weather.
16. Invasive Plants					Reference Sheet: _____ ✓ Handwritten
Generic Descriptor	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily in disturbed areas within the site.	If present, composition of invasive species, matches that expected for the site.
17. Reproductive Capability of Perennial Plants (native or seeded)					Reference Sheet: _____ ✓ Planted trees known FIRE Doug FIR
Generic Descriptor	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is moderately reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is slightly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not reduced relative to recent climatic conditions.

* Descriptions for each indicator should be more specific than those listed in the Generic Descriptors, if possible, and refer to the criteria included in the None to Slight description, which is based on the Reference Sheet (Appendix 1).

Soil Stability Test Data Form

Monitoring plot: WC #1 Observer: Jade Jensen Date: 5/16/13
 Recorder: M. Marston Page 1 of 1

Veg = NC (no perennial canopy), G (grass or grass/shrub mix), F (forb), Sh (shrub), T (tree). # = Stability value (1-6). Circle value if samples are hydrophobic.

Surface

Line 1				Line 2				Line 3				Line 4				Line 5				Line 6							
Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time
	1	0:00	5:00	2	4	0:15	5:15	4	7	0:30	5:30	1	10	0:45	5:45	2	13	1:00	6:00	2	16	1:15	6:15	5			
	2	1:30	6:30	2	5	1:45	6:45	3	9	2:00	7:00	1	11	2:15	7:15	4	14	2:30	7:30	3	17	2:45	7:45	4			
	3	3:00	8:00	2	6	3:15	8:15	1	9	3:30	8:30	1	12	3:45	8:45	4	15	4:00	9:00	3	18	4:15	9:15	1			

Notes: _____

Subsurface

Line 7				Line 8				Line 9				Line 10				Line 11				Line 12							
Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time	Pos	Veg	In time	Dip time
		0:00	5:00			0:15	5:15			0:30	5:30			0:45	5:45			1:00	6:00			1:15	6:15				
		1:30	6:30			1:45	6:45			2:00	7:00			2:15	7:15			2:30	7:30			2:45	7:45				
		3:00	8:00			3:15	8:15			3:30	8:30			3:45	8:45			4:00	9:00			4:15	9:15				

Notes: _____

Avg. Stability = Sum of Stability Rankings (i.e., #) / Total No. Samples Taken = 2.5

Line	All samples		Protected samples (Samples w/Veg = G, Sh, or T)		Unprotected samples (Samples w/Veg = NC)	
	Surface	Subsurface	Surface	Subsurface	Surface	Subsurface
Plot Avg.						



Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation (Bold items require completion, other information is optional)

State UT Office 080 Management Unit Water Canyon
 Pasture/Watershed _____ ID# WCL-2 Major Land Resource Area _____
 Location (description) X=534114.37 Y=4406738.00 UTM Zone 12N 19A 83 (cont.)
 Legal T _____, R _____, Sec _____, _____ 1/4, _____ 1/4 or Lat _____, Long _____ or UTM Coord _____
 Size of Evaluation Area 10 ac Photo(s) Taken Yes No _____
 Observer(s) Olmstead, Wimmer, Zwetzig Date 10/24/08
 Ecological Site _____ Soil Map Unit Name _____

Soil/Site Verification

Rangeland Ecological Site Description and/or Soil Survey _____ Area of Interest Determination _____
 Surface Texture _____ Surface Texture _____
 Depth: Very Shallow Shallow Moderate Deep Depth: Very Shallow Shallow Moderate Deep
 (<10") (10"-20") (20"-40") (>40") (<10") (10"-20") (20"-40") (>40")
 List diagnostic horizons in profile and depth List diagnostic horizons in profile and depth
 1 _____ 3 _____ 1 _____ 3 _____
 2 _____ 4 _____ 2 _____ 4 _____

Parent Material _____ Slope 5-7 % Elevation _____ ft Topographic Position _____ Aspect S

Avg Annual Precip 10-12 Recent Weather (last 2 years) Drought Normal Wet _____

Describe wildlife and livestock use and recent disturbances some livestock use (minimal) w/
deer elk signs more common

Describe offsite influences on area of interest rd to the south, drainage to
the east (perennial?)

Part 2. Indicator Rating

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
S,H	1. Rills					
Comments:						
S,H	2. Water Flow Patterns					
Comments:						
S,H	3. Pedestals and/or Terracettes					
Comments:						
S,H	4. Bare Ground					
Comments:						
S,H	5. Gullies					
Comments:						
S	6. Wind-Scoured, Blowouts, and/or Deposition Areas					
Comments:						

Part 2. Indicator Rating (continued)

Attribute	Indicators	Departure from Ecological Site Description/ Ecological Reference Area(s)				
		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
H	7. Litter Movement					✓
Comments:						
S,H,B	8. Soil Surface Resistance to Erosion					✓
Comments:						
S,H,B	9. Soil Surface Loss or Degradation					✓
Comments:						
H	10. Plant Community Composition and Distribution Relative to Infiltration and Runoff					✓
Comments:						
S,H,B	11. Compaction Layer					✓
Comments:						
B	12. Functional/Structural Groups					✓
Comments:						
B	13. Plant Mortality/Decadence					✓
Comments:						
H,B	14. Litter Amount					✓
Comments:						
B	15. Annual Production					✓
Comments:						
B	16. Invasive Plants				✓	
Comments:						
B	17. Reproductive Capability of Perennial Plants					✓
Comments:						

Part 3. Summary

Departure from Ecological Site Description/
Ecological Reference Area(s)

A. Indicator Summary

Rangeland Health Attributes		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	Σ
S	Soil/Site Stability (Indicators 1-6, 8, 9 & 11)						9
H	Hydrologic Function (Indicators 1-5, 7-11 & 14)						11
B	Biotic Integrity (Indicators 8-9 & 11-17)						9

B. Attribute Summary - Check the category that best fits the "preponderance of evidence" for each of the three attributes relative to the distribution of indicator ratings in the preceding Indicator Summary table.

Attribute	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Soil/Site Stability Rationale:					✓
Hydrologic Function Rationale:					✓
Biotic Integrity Rationale:					✓

Cover Worksheet

State Ut Office 280 Ecological Site _____
 Observer(s) Winnie, Olusdad, Zuehly Date 4/24/08 Site ID WC1-2

LIFE FORMS ¹	COVER CLASSES (% Canopy)							
	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Grass								
Annual		✓						
Native Perennial				✓				
Exotic Perennial			✓					
II - Forb								
Annual		✓						
Perennial					✓			
III - Shrub								
							✓	
IV - Tree								
				✓				
V - Succulent								
	✓	✓						
VI - Biological Crust								
		✓						
% GROUND COVER ²	0	0-1	2-5	6-15	16-30	31-50	51-75	76-100
I - Vascular Plants								✓
II - Standing Dead Vegetation		✓						
III - Litter (in contact with the soil surface)			✓					
IV - Biological Crust		✓						
V - Rock/Gravel		✓						
VI - Bare Ground			✓					

¹ **Life Forms Cover** - Record multiple canopy cover classes; total plant canopy may exceed 100%. Small openings (less than 2" in diameter) are included as cover.

² **Ground Cover** - Category I is an estimate of total vascular plant cover; overlapping canopies are counted as only **one** canopy (record life form with first point of contact). Total vascular plant cover (I) together with the sum of cover in Categories II-VI should total to approximately 100%.

Notes: Include source of cover data (e.g., estimates or measurements)

Species Dominance Worksheet

Part 1 (Required)

The most common species, noxious weeds (state-listed plants), invasive natives, invasive exotics (non-noxious) are **ranked** according to dominance using cover or weight .

Dominant Species on Site

- 1 Wyo big sage
- 2 snowberry
- 3 western wheatgrass
- 4 rubber rabbitbrush

Noxious Weeds

- 1 roundstemon
- 2 ~~stinkweed~~
- 3 _____

Invasive Natives *increase*

- 1 Utah juniper
- 2 rocky mtn juniper
- 3 stinkweed

Invasive Exotics

- 1 cheatgrass
- 2 ~~Round~~ Kentucky bluegrass
- 3 _____

Part 2 (Optional) Dominant Species by Life Form

The most common species are ranked according to dominance using cover or weight by life form.

Annual Grasses

- 1 _____
- 2 _____
- 3 _____

Annual Forbs

- 1 _____
- 2 _____
- 3 _____

Perennial Grasses

- 1 _____
- 2 _____
- 3 _____

Perennial Forbs

- 1 _____
- 2 _____
- 3 _____

Shrubs and Trees

- 1 _____
- 2 _____
- 3 _____

Succulents

- 1 _____
- 2 _____
- 3 _____

Biological Crust (rate by component not species, e.g., lichen, moss, or algae)

- 1 _____
- 2 _____
- 3 _____

Rangeland Health Indicator Evaluation Matrix

State UT Office 080 Ecological Site _____ Site ID WC1-2

If indicator(s) revised - Observer(s) Oliverstad, Wimmer, Zuehl Date 4/24/08

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills (Default Descriptor)	Rill formation is severe and well defined throughout most of the area.	Rill formation is moderately active and well defined throughout most of the area.	Active rill formation is slight at infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blunted or muted features.	Current or past formation of rills as expected for the site.
1. Rills (Revised Descriptor)					✓
2. Water Flow Patterns (Default Descriptor)	Extensive and numerous; unstable with active erosion; usually connected.	More numerous than expected; deposition and cut areas common; occasionally connected.	Nearly matches what is expected for the site; erosion is minor with some instability and deposition.	Matches what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
2. Water Flow Patterns (Revised Descriptor)					✓
3. Pedestals and/or Terracettes (Default Descriptor)	Abundant active pedestalling and numerous terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns and/or on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.
3. Pedestals and/or Terracettes (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
4. Bare Ground (Default Descriptor)	Much higher than expected for the site. Bare areas are large and generally connected.	Moderately to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	Amount and size of bare areas nearly to totally match that expected for the site.
4. Bare Ground (Revised Descriptor)					✓
5. Gullies (Default Descriptor)	Common with indications of active erosion and downcutting; vegetation is infrequent on slopes and/or bed. Nickpoints and headcuts are numerous and active.	Moderate to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; downcutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon with vegetation stabilizing the bed and slopes; no signs of active headcuts, nickpoints, or bed erosion.	Drainages are represented as natural stable channels; no signs of erosion with vegetation common.
5. Gullies (Revised Descriptor)					✓
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Default Descriptor)	Extensive.	Common.	Occasionally present.	Infrequent and few.	Matches what is expected for the site.
6. Wind-Scoured, Blowouts, and/or Deposition Areas (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
7. Litter Movement (wind or water) (Default Descriptor)	Extreme; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate to small size classes of litter have been displaced.	Moderate movement of smaller size classes in scattered concentrations around obstructions and in depressions.	Slightly to moderately more than expected for the site with only small size classes of litter being displaced.	Matches that expected for the site with a fairly uniform distribution of litter.
7. Litter Movement (wind or water) (Revised Descriptor)					✓
8. Soil Surface Resistance to Erosion (Default Descriptor)	Extremely reduced throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	Matches that expected for the site. Surface soil is stabilized by organic matter decomposition products and/or a biological crust.
8. Soil Surface Resistance to Erosion (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
9. Soil Surface Loss or Degradation (Default Descriptor)	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded than, that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation, especially in plant interspaces.	Soil surface horizon intact. Soil structure and organic matter content match that expected for the site.
9. Soil Surface Loss or Degradation (Revised Descriptor)					✓
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Default Descriptor)	Infiltration is severely decreased due to adverse changes in plant community composition and/or distribution. Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution. Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition and/or distribution. Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	Infiltration and runoff are equal to that expected for the site. Plant cover (distribution and amount) adequate for site protection.
10. Plant Community Composition and Distribution Relative to Infiltration and Runoff (Revised Descriptor)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
11. Compaction Layer (below soil surface) (Default Descriptor)	Extensive; severely restricts water movement and root penetration.	Widespread; greatly restricts water movement and root penetration.	Moderately widespread; moderately restricts water movement and root penetration.	Rarely present or is thin and weakly restrictive to water movement and root penetration.	None to minimal; not restrictive to water movement and root penetration.
11. Compaction Layer (below soil surface) (Revised Descriptor)					✓
12. Functional/ Structural Groups (F/S Groups) (Default Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)	Number of F/S groups greatly reduced; and/or relative dominance of F/S groups has been dramatically altered; and/or number of species within F/S groups dramatically reduced.	Number of F/S groups reduced; and/or one dominant group and/or one or more subdominant groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups significantly reduced.	Number of F/S groups moderately reduced; and/or one or more subdominant F/S groups replaced by F/S groups not expected for the site; and/or number of species within F/S groups moderately reduced.	Number of F/S groups slightly reduced; and/or relative dominance of F/S groups has been modified from that expected for the site; and/or number of species within F/S groups slightly reduced.	F/S groups and number of species in each group closely match that expected for the site.
12. Functional/ Structural Groups (F/S Groups) (Revised Descriptor) (See Appendix 5 - Functional/ Structural Groups Worksheet)					✓

Rangeland Health Indicator Evaluation Matrix

(continued)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
13. Plant Mortality/Decadence (Default Descriptor)	Dead and/or decadent plants are common.	Dead and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	Plant mortality and decadence matches that expected for the site.
13. Plant Mortality/Decadence (Revised Descriptor)					✓
14. Litter Amount (Default Descriptor)	Largely absent or dominant relative to site potential and weather.	Greatly reduced or increased relative to site potential and weather.	Moderately more or less relative to site potential and weather.	Slightly more or less relative to site potential and weather.	Amount is what is expected for the site potential and weather.
14. Litter Amount (Revised Descriptor)					✓
15. Annual Production (Default Descriptor)	Less than 20% of potential production.	20-40% of potential production.	40-60% of potential production.	60-80% of potential production.	Exceeds 80% of potential production.
15. Annual Production (Revised Descriptor)					✓
16. Invasive Plants (Default Descriptor)	Dominate the site.	Common throughout the site.	Scattered throughout the site.	Present primarily on disturbed sites.	Rarely present on the site.
16. Invasive Plants (Revised Descriptor)				✓	

Rangeland Health Indicator Evaluation Matrix

(concluded)

Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)					
Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17. Reproductive Capability of Perennial Plants (native or seeded) (Default Descriptor)	Capability to produce seed or vegetative tillers is severely reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is greatly reduced relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is somewhat limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is only slightly limited relative to recent climatic conditions.	Capability to produce seed or vegetative tillers is not limited relative to recent climatic conditions.
17. Reproductive Capability of Perennial Plants (native or seeded) (Revised Descriptor)					✓

Record rating (1-6) in shaded cells. Cells are arranged in 3 x 6 pattern of typical kit (see diagram)

Loc	Surface			1 inch			Loc	Surface			1 inch			Loc	Surface			1 inch			
	In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#		In Time	Dip Time	#	In Time	Dip Time	#	
	0:00	5:00	1	0:45	5:45	3		1:30	6:30	3	2:15	7:15	4		3:00	8:00	3	3:45	8:45	2	16
	0:15	5:15	1	1:00	6:00	3		1:45	6:45	3	2:30	7:30	1		3:15	8:15	3	4:00	9:00	1	12
	0:30	5:30	3	1:15	6:15	3		2:00	7:00	3	2:45	7:45	4		3:30	8:30	2	4:15	9:15	2	17 45

"Loc" is location (e.g., location along a line transect if used). It is optional.

Samples should be less than 1/4" in diameter and less than 1/8" thick.

"Surface" is soil surface sample. "1 inch" is removed from soil 3/4 - 1" below surface.

(25)

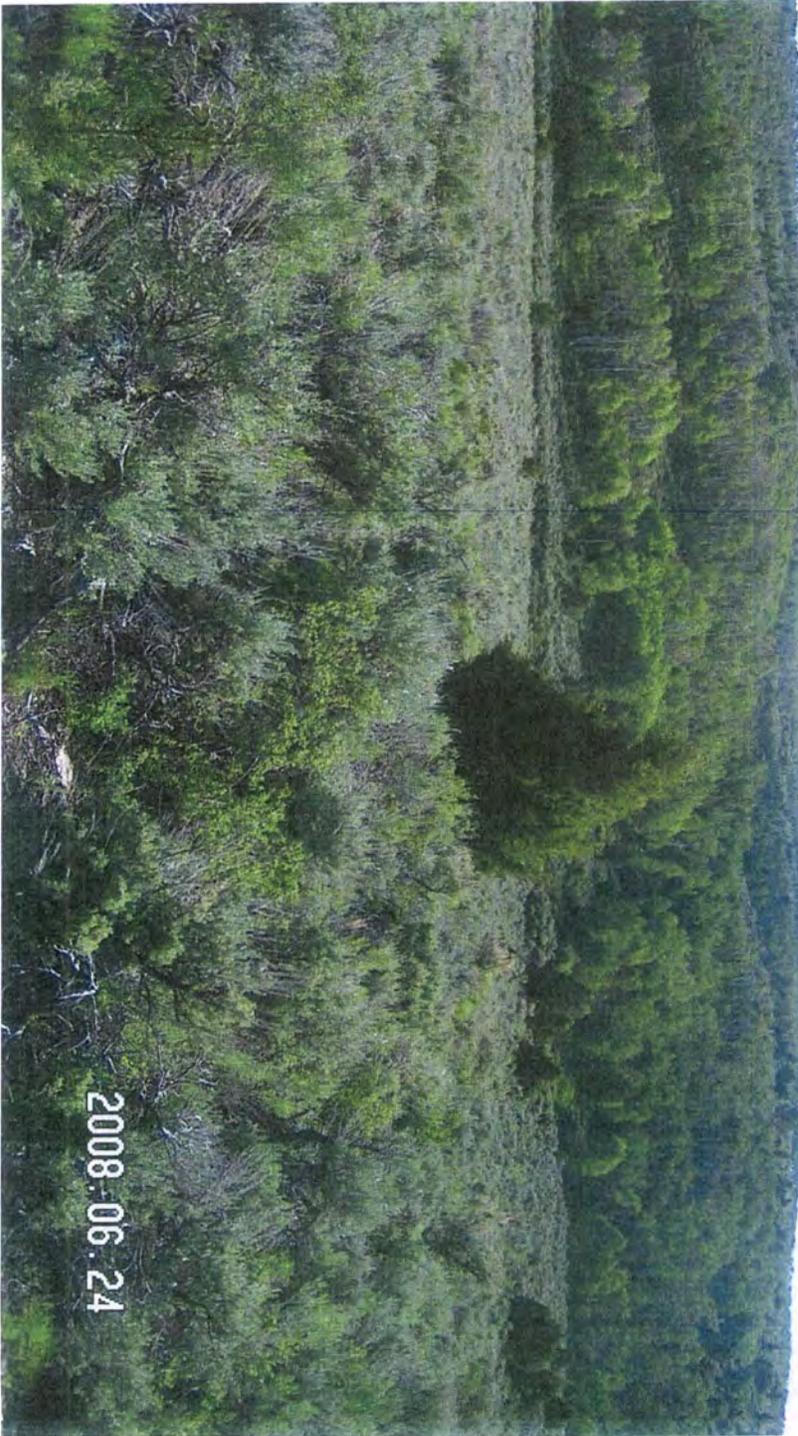
Table 1. Soil Stability Evaluation for 1/4"-diameter Air-Dry Samples

ALWAYS Sieve Soils (even if rated ≤ 3) to Verify Class	
Stability class	Criteria for assignment to stability class (for Standard Characterization)*
0	Soil too unstable to sample (falls through sieve)*.
1	50 % of structural integrity lost within 5 seconds of insertion in water.
2	50 % of structural integrity lost 5—30 seconds after insertion.
3	50 % of structural integrity lost 30—300 seconds after insertion or <10% of soil remains on sieve after 5 dipping cycles.
4	10 - 25% of soil remains on sieve after 5 dipping cycles.
5	25 - 75% of soil remains on sieve after 5 dipping cycles.
6	75 - 100% of soil remains on sieve after 5 dipping cycles.

* If too unstable to sample, try gently wetting with a mister (perfume bottle available at drug stores), remove sample, and allow to air-dry before testing.



UCI-26

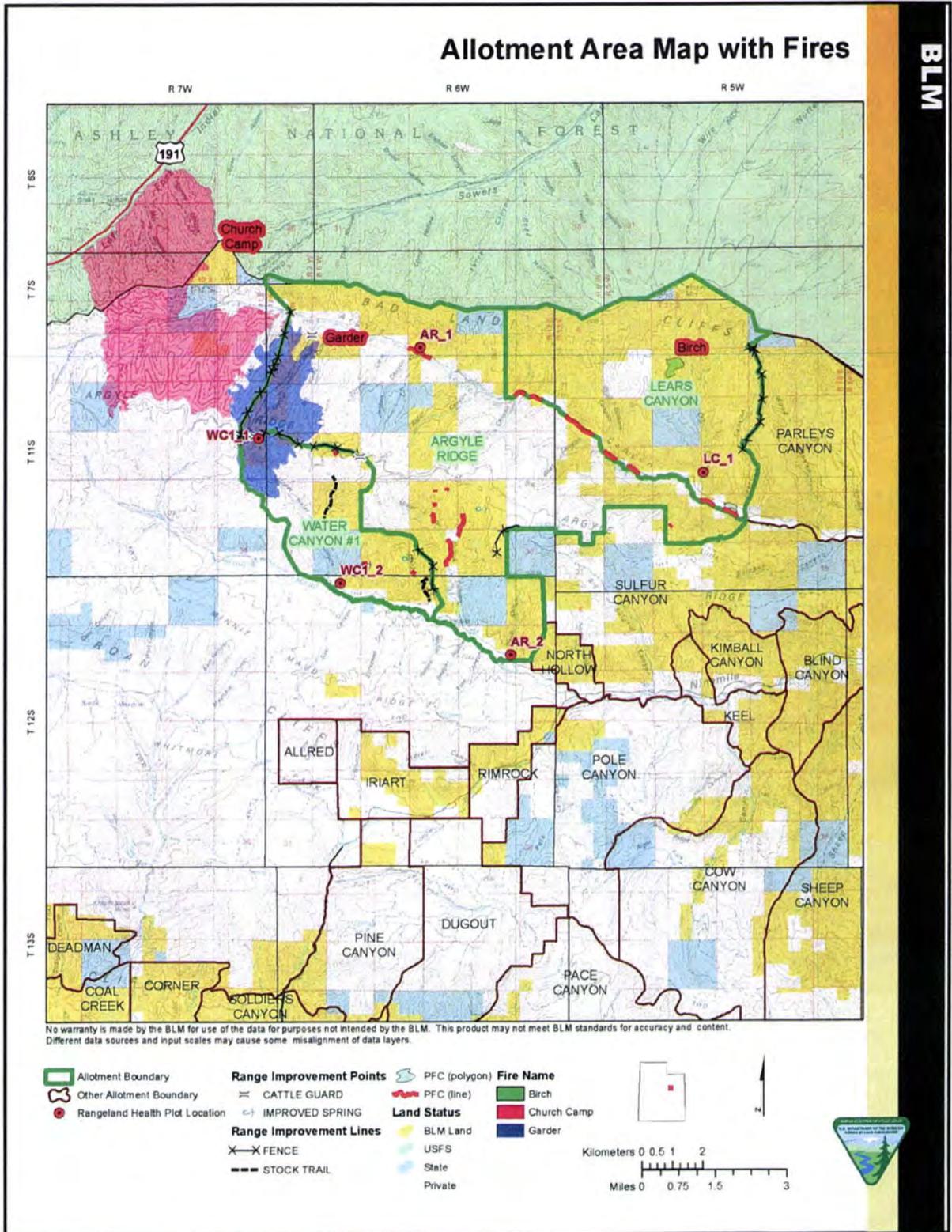


WCI-2d



1001-24

Appendix E - Allotment Maps (include RH/PFC/burn area polygons)



BLM

Appendix F: Utah Department of Environmental Quality Stream Assessments

[zoom to](#)

Stream: Argyle Creek

[zoom to](#)

Assessment Unit: Ninemile

[zoom to](#)

Unit ID	UT14060005-003
Unit Description	Ninemile Creek and tributaries from Green River confluence to headwaters
Watershed Management Unit	Uinta Basin
Anti-Degradation Category	Category 3 = Water quality degradation may be allowed outside USFS boundary pursuant to antidegradation review
Beneficial Uses	Use Class 2B = Infrequent primary contact recreation (e.g. wading, fishing); Use Class 3A = Cold water fishery/aquatic life; Use Class 4 = Agricultural uses (crop irrigation and stock watering)
2010 Assessment	Assessment Category 5 = Impaired: TMDL required (303d list)
Beneficial Use: Cause of Impairment	Use Class 3A: Water Temperature
TMDL Approved: Cause of Impairment	n/a
TMDL Information	link
TMDL Required: 303d Cause of Impairment	Water Temperature
Aquatic Habitat Impairment	n/a
Blue Ribbon Fishery	none
Watershed Scientist	Sandy Wingert
Email	swingert@utah.gov
Phone	801-536-4338
Address	P.O. Box 144870
City	Salt Lake City
Zip4	84114-4870

Stream: Minnie Maud Creek

[zoom to](#)

Assessment Unit: Ninemile

[zoom to](#)

Unit ID	UT14060005-003
Unit Description	Ninemile Creek and tributaries from Green River confluence to headwaters
Watershed Management Unit	Uinta Basin
Anti-Degradation Category	Category 3 = Water quality degradation may be allowed outside USFS boundary pursuant to antidegradation review
Beneficial Uses	Use Class 2B = Infrequent primary contact recreation (e.g. wading, fishing); Use Class 3A = Cold water fishery/aquatic life; Use Class 4 = Agricultural uses (crop irrigation and stock watering)

irrigation and stock watering)
2010 Assessment Assessment Category 5 = Impaired: TMDL required (303d list)
Beneficial Use: Cause of Use Class 3A: Water Temperature
Impairment
TMDL Approved: Cause n/a
of Impairment
TMDL Information [link](#)
TMDL Required: 303d Water Temperature
Cause of Impairment
Aquatic Habitat n/a
Impairment
Blue Ribbon Fishery none
Watershed Scientist Sandy Wingert
Email swingert@utah.gov
Phone 801-536-4338
Address P.O. Box 144870
City Salt Lake City
Zip4 84114-4870
More Information

Appendix G: Riparian PFC Photos and Evaluations

Argyle Site #1 2013, Argyle Creek

Location: Township 11 S, Range 6 W, Section 8









Standard Checklist

Name of Riparian-Wetland Area: Argyle Creek
 Date: 5/16/13 Segment/Reach ID: Prev. PFC re-read
 Miles: 1/2 mile Acres: 6 acres (T 11 S, S. 8)
 ID Team Observers: Palmer, white Bull MARSTON, BRYAN, JENSEN (R 16 W) ^{per AB}

CAMPING/FISHING LOCATION/REC USE

HEAVY ROAD ALLUVIUM WASHING

Yes	No	N/A	HYDROLOGY
	✓		1) Floodplain above bankfull is inundated in "relatively frequent" events
✓			2) Where beaver dams are present they are active and stable
✓			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
✓			4) Riparian-wetland area is widening or has achieved potential extent
	✓		5) Upland watershed is not contributing to riparian-wetland degradation

Yes	No	N/A	VEGETATION
✓			6) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
	✓		7) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
✓			8) Species present indicate maintenance of riparian-wetland soil moisture characteristics
✓			9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
✓			10) Riparian-wetland plants exhibit high vigor
	✓		11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
✓			12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

CA...
 ...
 ...

Yes	No	N/A	EROSION/DEPOSITION
✓			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
✓			14) Point bars are revegetating with riparian-wetland vegetation
✓			15) Lateral stream movement is associated with natural sinuosity
✓			16) System is vertically stable
✓			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Lack of woody notes

File 600

(Revised 1998)

Remarks

Tlow 2012 FIRE "Churon Camp Fire"

Ash: SILT bars apparent in sections

Prior Fire activity

Naturally at risk

Summary Determination

Functional Rating:

Proper Functioning Condition

Functional—At Risk

Nonfunctional

Unknown

*Some discussion
found on water
upland disturbance*

Trend for Functional—At Risk:

Upward

Downward

Not Apparent

Are factors contributing to unacceptable conditions outside the control of the manager?

Yes

No

If yes, what are those factors?

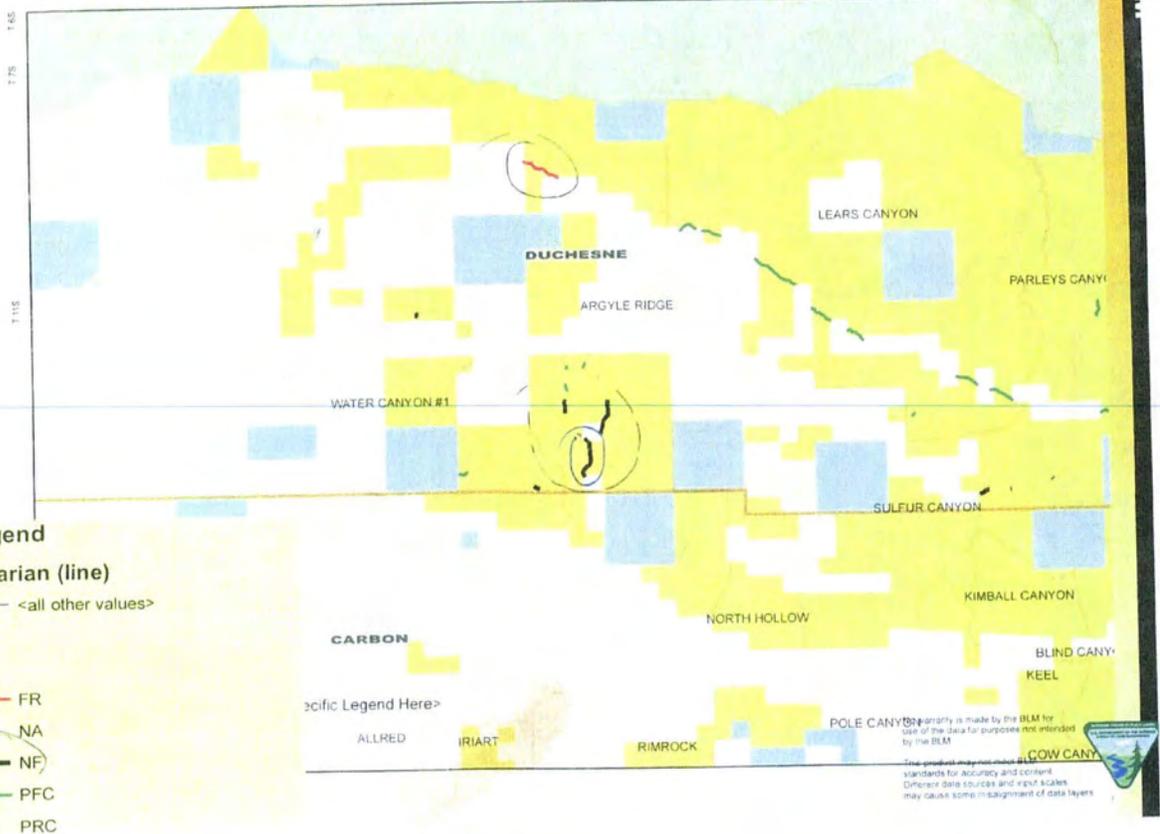
Flow regulations Mining activities Upstream channel conditions ^{*private*}

Channelization Road encroachment Oil field water discharge

Augmented flows Other (specify) *Res. Use*

<Insert Date Here>

<Insert Map Title Here>



Legend

Riparian (line)

— <all other values>

FC

- FR
- NA
- PFC
- PRC

<specific Legend Here>

Priority is made by the BLM for
 use of the data for purposes not intended
 by the BLM.

The product may not meet
 standards for accuracy and content.
 Different data sources and input scales
 may cause some misalignment of data layers.



Argyle Site #2, 2013, Near Sulfur Creek drainage
Location: Township 11 S, Range 6 W, Section 34

Standard Checklist

Name of Riparian-Wetland Area: Sulfur Canyon
 Date: 5-17-13 Segment/Reach ID: 2 mile S.K. up Canyon to Spring heads
 Miles: 7 Acres: 8
 ID Team Observers: Alec Bryan Jade Jensen

Yes	No	N/A	HYDROLOGY
	X		1) Floodplain above bankfull is inundated in "relatively frequent" events
		X	2) Where beaver dams are present they are active and stable
X			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
		X	4) Riparian-wetland area is widening or has achieved potential extent
	X		5) Upland watershed is not contributing to riparian-wetland degradation

Yes	No	N/A	VEGETATION
		X	6) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
		X	7) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
		X	8) Species present indicate maintenance of riparian-wetland soil moisture characteristics
	X		9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
		X	10) Riparian-wetland plants exhibit high vigor
	X		11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
X			12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

Yes	No	N/A	EROSION/DEPOSITION
X			13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
	X	X	14) Point bars are revegetating with riparian-wetland vegetation
X			15) Lateral stream movement is associated with natural sinuosity
X			16) System is vertically stable
X			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

(Revised 1998)

Remarks

Not a real/designated riparian
area. It is PFC, but only because
it doesn't meet the standards for a riparian
area in the first place, and it is unsuitable
to do plant measurements of Minus on

Summary Determination

Functional Rating:

Proper Functioning Condition Y
Functional—At Risk
Nonfunctional
Unknown

Trend for Functional—At Risk:

Upward X
Downward
Not Apparent

Are factors contributing to unacceptable conditions outside the control of the manager?

Yes Y
No

If yes, what are those factors?

 Flow regulations Mining activities Upstream channel conditions
 Channelization Road encroachment Oil field water discharge
 X Augmented flows Other (specify) Run-off







Appendix H: Standard Terms and Conditions

Standard Terms and Conditions:

The permit would include the following Standard Terms and Conditions:

- An assessment has been made of the allotment(s) covered under this permit. It has been determined by the Authorized Officer that the allotment(s) are meeting or making progress towards meeting the Utah BLM Standards for Rangeland Health and the Fundamentals of Rangeland Health.
- If future monitoring indicates non-conformance with the Utah BLM Standards for Rangeland Health and the Fundamentals of Rangeland Health, a permit or the permits may be modified and reissued with Terms and Conditions that will result in conformance.
- Livestock use would not exceed the available AUMs.
- The BLM will assess resource conditions through field inspections and determine, in consultation with each of the permittees, management changes (e.g., changes in livestock numbers, adjustment of move dates, or other changes of use within the parameters identified) that may be implemented prior to reaching maximum utilization. Move dates may be adjusted as needed when monitoring indicates maximum utilization has been reached, or due to unusual climatic conditions, fire, flood, or other act of nature. If maximum utilization is reached on key species/areas in the allotment before a scheduled move, the use of salt, herding, or other management options may be used to distribute livestock away from an area where maximum utilization has been reached, or livestock may be moved from the use area or allotment (after consultation with the permittee) as deemed necessary by the BLM.
- All livestock are expected to be removed from the given pasture and/or allotment on the livestock off date. Any livestock left with in the allotment/s after the off date will be in trespass.
- Supplemental feeding requires approval from the BLM Authorized Officer.
- Feeding of hay, straw, pellets etc. shall be certified weed free and marked with appropriate label/tags.
- Supplements such as salt/mineral blocks, molasses tubs, etc... shall be placed no less than 100 feet off roads, fence lines and trails, and at least 300 feet from streams, ponds and troughs. Supplements will be moved from areas where proper utilization has been reached to facilitate uniform distribution of livestock.
- Dead livestock shall be moved by the permittee at least 300 feet from streams, springs, ponds, guzzlers and troughs, and 100 feet off roads, fence lines and trails.
- The permittee may be required to haul water, providing a water truck and troughs to areas lacking water in order to improve livestock distribution.
- If livestock other than the permittees would be run on the allotment/s, the permittee shall contact the Vernal Field Office Range Management Staff for approval.
- Failure to make payment within 30 days after the due date may result in trespass.

- A service charge may be charged for any replacement bill issued for changes in grazing use.
- Maintenance of Range projects is the responsibility of the permittee. All Range projects must be maintained prior to the movement of livestock onto the allotment/pasture. Prior approval is required before maintenance is performed. Maintenance of range improvements will follow the original design specifications and be completed in a timely manner to assure that the improvements are kept up to the original standard in order to achieve the anticipated (reasonable) life expectancy of the improvements. If any failure to provide maintenance results in a shortened life expectancy of the improvements, replacement costs will be the permittees responsibility. See Cooperative Agreement for Terms and Conditions.
- The permittee shall provide administrative access across private and leased lands to the Vernal Field Office for the Orderly Management and Protection of the Public Lands.
- However, any area within the allotments not in compliance with the Fundamentals of Rangeland Health, Utah Guidelines for Grazing management, Utah Standards for Rangeland Health may either have a permit withheld or grazing modified.

Appendix I: Allotment Monitoring Schedule

Rangeland Health/PFC Schedule

Permitee Name	Allotment Name	Allotment Number	Recent RH	Next Scheduled RH	Recent PFC	Next Scheduled PFC
Fas/Jen	AR	04873	2013	2018	2013	2023
Oman	AR	04873	2013	2018	2013	2023
Staker	AR	04873	2013	2018	2013	2023
Terry	AR	04873	2013	2018	2013	2023
Fas/Jen	LC	04875	2008	2013	1999	Due
Day	LC	04875	2008	2013	1999	Due
JTJJ	WC #1	04876	2013	2018	1999	Due

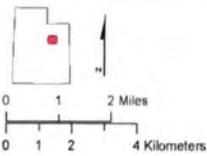
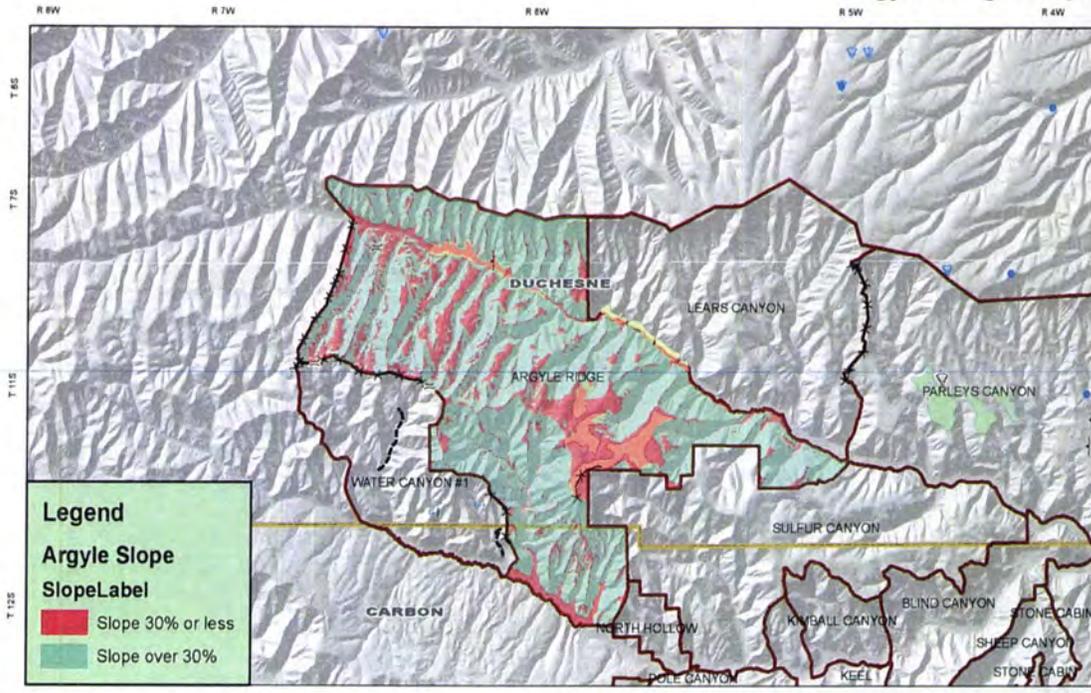
Appendix J: Slope Maps 1-3

Map 1, Argyle Ridge Slope

June 10, 2013

Argyle Ridge Slope

BLM



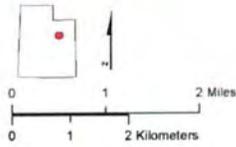
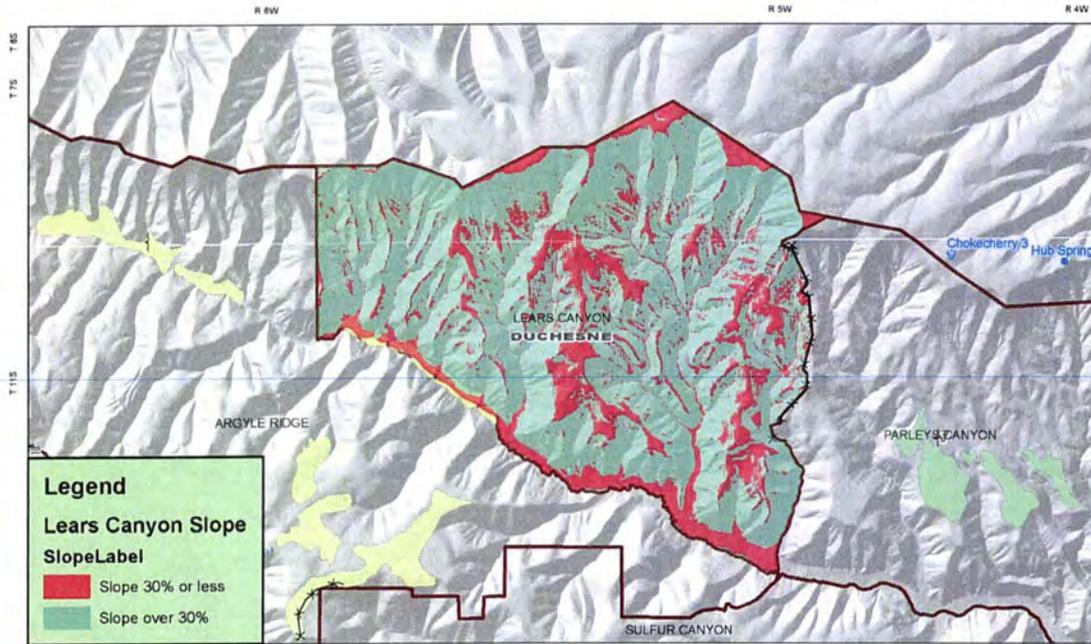
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Map 2, Lears Canyon Slope

June 10, 2013

Lears Canyon Slope

BLM

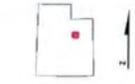
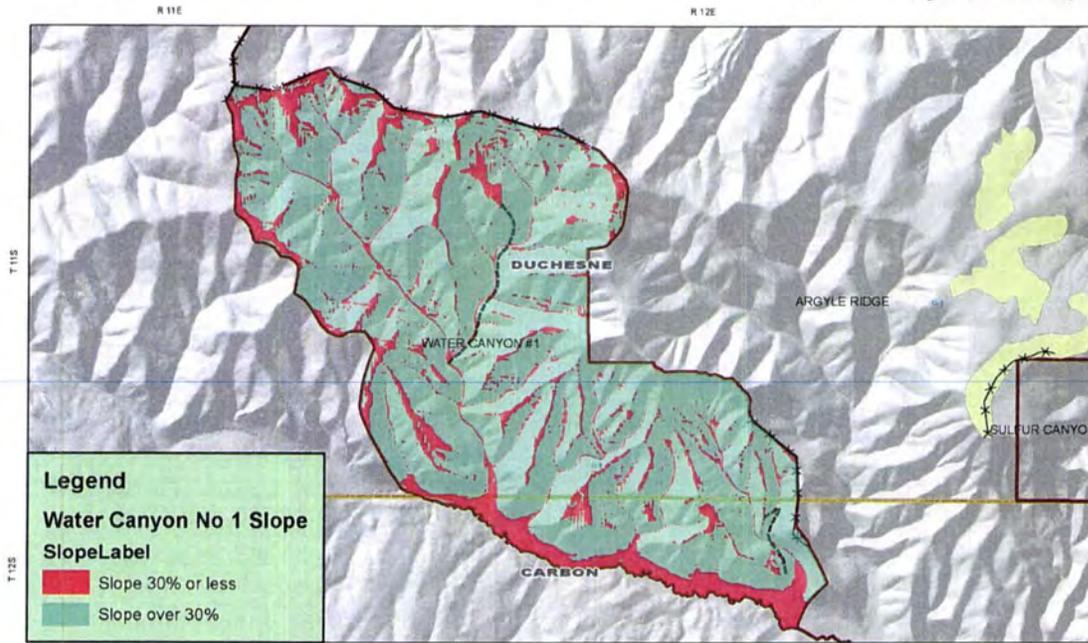


No warranty is made by the BLM for use of the data for purposes not intended by the BLM.
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Map 3, Water Canyon #1 Slope

June 10, 2013

Water Canyon #1 Slope



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Appendix K: Determination for Rangeland Health

RANGELAND HEALTH STANDARDS DETERMINATION

Site/Area: Argyle Ridge Allotment

Allotment Acres: 20,709 total acres

Compliance with Rangeland Health Standards:

Standard	Standard Met	Progress Towards Meeting	Rationale: (Summarize the evidence and indicators used to reach conclusions regarding meeting, not meeting and the progress towards meeting each Standard.)
# 1 Upland Soils	<u>YES/NO</u>	YES/NO	An interdisciplinary team conducted surveys for Rangeland Health Standards throughout June of 2008. Surveys were again conducted randomly in May of 2013 on previous sites. These surveys indicated that the standards are still being met. An Environmental Assessment was prepared on June 24, 2013, and analyzed for soils and it was determined that the soils component met standards.
# 2 Riparian Areas	<u>YES/NO</u>	YES/NO	Inventoried riparian areas are within the allotments, primarily within the Argyle and Minnie Maud drainage. Observations of these riparian areas were conducted and were considered to be in Properly Functioning Condition. Utilization monitoring, working with the permit holder on livestock management, resource staff management of the riparian and drainage areas, and monitoring of Rangeland Health Standards will provide protection to maintain riparian in Properly Functioning Condition.
# 3 Healthy and productive plant and animal communities (Desired plant and wildlife species, and habitats)	<u>YES/NO</u>	YES/NO	Rangeland Health Standards were performed throughout June, 2008 and May of 2013. The Environmental Assessment prepared June 24 2013, analyzed for wildlife and special status species determined that the biotic component met Standards.
# 4 Special status, threatened and endangered species	<u>YES/NO</u>	YES/NO	Rangeland Health Standards performed throughout June, 2008 and 2013 for the Environmental Assessment prepared in June 24 2013, analyzed for special status species both plant and animal and determined that this biotic component met Standards.

Notes: Standards #2 and #3 may not be applicable. If so indicate NA.

If Standard is met Progress towards Meeting is not applicable (NA).

If progress is unknown (UNK) indicate as such and implement appropriate monitoring.

Causal Factors

determined that the Aryle Ridge Allotment _____ (watershed, **allotment** or other scale) X
Meets _____ **Fails to Meet but is making progress toward meeting** _____ **Fails to Meet and is not making significant progress toward meeting** Utah's Standards for Rangeland Health and that current grazing practices X **are** _____ **are not** in conformance with Utah's Guidelines for Grazing Management. I have also determined that livestock grazing management practices _____ **are** X **are not** a significant factor in failing to achieve the Standards.

Signature: Michelle Brown

Date: 6/25/13

Title: Assistant Field Manager - Renewables

Consider the following questions regarding livestock grazing as a Causal Factor:

1) Is it more likely than not that existing grazing management practices or levels of grazing use are significant factors in failing to achieve the Standards or conform to the guidelines? YES NO

2) Is it more likely than not that existing grazing management needs to be modified to ensure that the Fundamentals of rangeland health are met, or making significant progress toward being met? YES NO

For those Standards not being met, identify the causal factors and the evidence used to reach a conclusion regarding causal factors: All factors are being met.

Standard #1:

Causal Factor(s):
Evidence Used:

Standard #2:

Causal Factors(s):
Evidence Used:

Standard #3:

Causal Factor(s);
Evidence Used:

Standard #4:

Causal Factor(s):
Evidence Used:

Standard #5:

Causal Factor(s):
Evidence Used:

Conformance with Guidelines for Grazing Management

Existing grazing management **Conforms with** _____ **does not Conform with** Utah's Guidelines for Grazing Management.

If grazing management is not in conformance with Utah's Guidelines and one or more Standards are not being met, identify Guidelines not currently being followed:

Determination Summary *(This is a summary of the information as shown above.)*

Based on my review of the Assessment Team's recommendation, Evaluation of Rangeland Health Standards and other relevant information, and as indicated in this document I have

RANGELAND HEALTH STANDARDS DETERMINATION

Site/Area: Lears Canyon Allotment

Allotment Acres: 10,703 total acres

Compliance with Rangeland Health Standards:

Standard	Standard Met	Progress Towards Meeting	Rationale: <i>(Summarize the evidence and indicators used to reach conclusions regarding meeting, not meeting and the progress towards meeting each Standard.)</i>
# 1 Upland Soils	<u>YES/NO</u>	YES/NO	An interdisciplinary team conducted surveys for Rangeland Health Standards throughout June of 2008. Surveys were again conducted randomly in May of 2013. These surveys indicated that the standards are being met. An Environmental Assessment was prepared on June X, 2013, and analyzed for soils and it was determined that the soils component met standards..
# 2 Riparian Areas	<u>YES/NO</u>	YES/NO	Inventoried riparian areas are within the allotments, primarily within the Argyle and Minnie Maud drainage. Observations of these riparian areas were conducted and were considered to be in Properly Functioning Condition. Utilization monitoring, working with the permit holder on livestock management, resource staff management of the riparian and drainage areas, and monitoring of Rangeland Health Standards will provide protection to maintain riparian in Properly Functioning Condition.
# 3 Healthy and productive plant and animal communities (Desired plant and wildlife species, and habitats)	<u>YES/NO</u>	YES/NO	Rangeland Health Standards were performed throughout June, 2008 and May of 2013. The Environmental Assessment prepared June 24, 2013, analyzed for wildlife and special status species determined that the biotic component met Standards.
# 4 Special status, threatened and endangered species	<u>YES/NO</u>	YES/NO	Rangeland Health Standards performed throughout June, 2008 and 2013 for the Environmental Assessment prepared in June 24, 2013, analyzed for special status species both plant and animal and determined that this biotic component met Standards.

Notes: Standards #2 and #3 may not be applicable. If so indicate NA.

If Standard is met Progress towards Meeting is not applicable (NA).

If progress is unknown (UNK) indicate as such and implement appropriate monitoring.

Causal Factors

Consider the following questions regarding livestock grazing as a Causal Factor:

1) Is it more likely than not that existing grazing management practices or levels of grazing use are significant factors in failing to achieve the Standards or conform to the guidelines? YES NO

2) Is it more likely than not that existing grazing management needs to be modified to ensure that the Fundamentals of rangeland health are met, or making significant progress toward being met? YES NO

For those Standards not being met, identify the causal factors and the evidence used to reach a conclusion regarding causal factors: All factors are being met.

Standard #1:

Causal Factor(s):

Evidence Used:

Standard #2:

Causal Factors(s):

Evidence Used:

Standard #3:

Causal Factor(s);

Evidence Used:

Standard #4:

Causal Factor(s):

Evidence Used:

Standard #5:

Causal Factor(s):

Evidence Used:

Conformance with Guidelines for Grazing Management

Existing grazing management **Conforms with** **does not Conform with** Utah's Guidelines for Grazing Management.

If grazing management is not in conformance with Utah's Guidelines and one or more Standards are not being met, identify Guidelines not currently being followed:

Determination Summary *(This is a summary of the information as shown above.)*

Based on my review of the Assessment Team's recommendation, Evaluation of Rangeland Health Standards and other relevant information, and as indicated in this document I have determined that the Lears Canyon Allotment *(watershed, allotment or other scale)* **Meets** **Fails to Meet but is making progress toward meeting** **Fails to Meet and is not making significant progress toward meeting** Utah's Standards for Rangeland

Health and that current grazing practices X **are** **are not** in conformance with Utah's Guidelines for Grazing Management. I have also determined that livestock grazing management practices **are** X **are not** a significant factor in failing to achieve the Standards.

Signature: Michelle Berra

Date: 6/25/13

Title: Assistant Field Manager - renewables

RANGELAND HEALTH STANDARDS DETERMINATION

Site/Area: Water Canyon #1 Allotment

Allotment Acres: 4,268 total acres

Compliance with Rangeland Health Standards:

Standard	Standard Met	Progress Towards Meeting	Rationale: <i>(Summarize the evidence and indicators used to reach conclusions regarding meeting, not meeting and the progress towards meeting each Standard.)</i>
# 1 Upland Soils	<u>YES/NO</u>	YES/NO	An interdisciplinary team conducted surveys for Rangeland Health Standards throughout June of 2008. Surveys were again conducted randomly in May of 2013. These surveys indicated that the standards are being met. An Environmental Assessment was prepared on June X, 2013, and analyzed for soils and it was determined that the soils component met standards..
# 2 Riparian Areas	<u>YES/NO</u>	YES/NO	Inventoried riparian areas are within the allotments, primarily within the Argyle and Minnie Maud drainage. Observations of these riparian areas were conducted and were considered to be in Properly Functioning Condition. Utilization monitoring, working with the permit holder on livestock management, resource staff management of the riparian and drainage areas, and monitoring of Rangeland Health Standards will provide protection to maintain riparian in Properly Functioning Condition.
# 3 Healthy and productive plant and animal communities (Desired plant and wildlife species, and habitats)	<u>YES/NO</u>	YES/NO	Rangeland Health Standards performed throughout June, 2008 and May of 2013. The Environmental Assessment prepared June 24, 2013, analyzed for wildlife and special status species determined that the biotic component met Standards.
# 4 Special status, threatened and endangered species	<u>YES/NO</u>	YES/NO	Rangeland Health Standards performed throughout June, 2008 and 2013 for the Environmental Assessment prepared in June 24, 2013, analyzed for special status species both plant and animal and determined that this biotic component met Standards.

Notes: Standards #2 and #3 may not be applicable. If so indicate NA.

If Standard is met Progress towards Meeting is not applicable (NA).

If progress is unknown (UNK) indicate as such and implement appropriate monitoring.

Causal Factors

Consider the following questions regarding livestock grazing as a Causal Factor:

1) Is it more likely than not that existing grazing management practices or levels of grazing use are significant factors in failing to achieve the Standards or conform to the guidelines? YES NO

2) Is it more likely than not that existing grazing management needs to be modified to ensure that the Fundamentals of rangeland health are met, or making significant progress toward being met? YES NO

For those Standards not being met, identify the causal factors and the evidence used to reach a conclusion regarding causal factors: All factors are being met.

Standard #1:

Causal Factor(s):
Evidence Used:

Standard #2:

Causal Factors(s):
Evidence Used:

Standard #3:

Causal Factor(s);
Evidence Used:

Standard #4:

Causal Factor(s):
Evidence Used:

Standard #5:

Causal Factor(s):
Evidence Used:

Conformance with Guidelines for Grazing Management

Existing grazing management **Conforms with** **does not Conform with** Utah's Guidelines for Grazing Management.

If grazing management is not in conformance with Utah's Guidelines and one or more Standards are not being met, identify Guidelines not currently being followed:

Determination Summary *(This is a summary of the information as shown above.)*

Based on my review of the Assessment Team's recommendation, Evaluation of Rangeland Health Standards and other relevant information, and as indicated in this document I have determined that the Water Canyon #1 Allotment *(watershed, allotment or other scale)* **Meets** **Fails to Meet but is making progress toward meeting** **Fails to Meet and is not making significant progress toward meeting** Utah's Standards for Rangeland

Health and that current grazing practices X **are** **are not** in conformance with Utah's Guidelines for Grazing Management. I have also determined that livestock grazing management practices **are** X **are not** a significant factor in failing to achieve the Standards.

Signature: Michelle Brown

Date: 6/25/13

Title: Assistant Field Manager - Renewables