Sage-grouse Playa Management Environmental Assessment

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The comment period on this Environmental Assessment (EA) ended in December, 2013. *The BLM is issuing four decisions covering different aspects of the action analyzed in the EA:*

1. ***Decision Record covering vegetative treatments*** *across the entire project area (mowing playas dominated by silver sagebrush and thinning young juniper),*
2. ***ZX Allotment Proposed Decision*** *covering the permit renewal, exclosure fences and water developments in that allotment,*
3. ***Hampton Allotment Proposed Decision*** *covering permit renewal, exclosure fences and water developments in that allotment, and*
4. ***Ram Lake Allotment Proposed Decision*** *covering permit renewal, exclosure fences and water developments in that allotment.*

At this time we are only issuing the first two decisions listed above; we will send a separate notification letter when we have prepared the decisions for the Hampton and Ram Lake Allotments.

We are re-publishing the EA and signed Finding of No Significant Impact (FONSI) to the web at this time. Please see the decisions for further information on the selected alternative and protest and appeal opportunities. The EA, FONSI, Decision Record and Proposed Decision are available at the BLM office listed above, and on the internet at the address listed above. The response to public comment and summary of minor changes to the EA are contained in the decisions.

Thank you for your interest in this project. If you have any questions, please contact Teal Purrington or Bill Dean at the Prineville District BLM (541) 416-6700.

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Chapter 1 Introduction

Proposed action

The BLM is proposing a number of actions on 143,027 acres of BLM-administered public land in and around playas south of Highway 20 near Hampton, Oregon (the "project area") including:

- Renew livestock grazing permits for 10 year term.
- Thin dense stands of young juniper.
- Thin silver sagebrush in playas.
- Re-route primitive routes so they don't go through playas.
- Fence playas to exclude livestock grazing.
- Fill in dugouts (artificial water holes) in playas.
- Install wells, water storage tanks, pipelines and troughs to replace water lost at filled-in dugouts.

Playa:

A nearly level area at the bottom of an undrained desert basin, sometimes temporarily covered with water. More on playas in Chapter 3 introduction.

A more detailed description of the proposed action and alternatives is in Chapter 2 of this EA. The project area (see Appendix C, Maps) is defined and described in detail in the Chapter 3 introduction.

Need for action

This proposal was prompted by two key needs. The first is that the livestock grazing permits for the ZX, Ram Lake and Hampton Allotments are expiring and BLM needs to consider the permittees' applications for renewal of the permits.

The second key need is to address threats to sage-grouse habitat. In March 2010 the U.S. Fish & Wildlife Service (USFWS) issued a finding that sage-grouse warrant listing as threatened under the Endangered Species Act. The listing was deferred because of other higher priority listings. A number of the threats identified in the USFWS finding are of concern in the project area, including fences, encroaching juniper, roads, and livestock grazing that is affecting sage-grouse habitat. Since the USFWS finding, the BLM has produced several interim management guidelines (BLM 2011a, BLM 2011b, BLM 2013) and collaborated with several federal and state agencies on a national technical report, and is amending resource management plans to direct sage-grouse conservation at the district level.

The Greater sage-grouse (*Centrocercus urophasianus*) (hereafter, sage-grouse) is a landscape-scale species that requires multiple, suitable sagebrush habitats for annual reproductive success and adult and juvenile survival. Historically, large size patches of intact sagebrush habitats existed across the western U.S., but since the arrival of Europeans many of these habitats have been degraded, reduced, or eliminated (Knick and Connelly 2011, Leu and Hanser 2011). Sage-grouse currently occupy approximately 50 percent of their potential habitat prior to European settlement (Schroeder et al. 2004). Alterations to sagebrush habitats from agricultural conversion, fire exclusion, renewable energy expansion, early land use policies and historical improper livestock grazing have attributed to these

declines (Knick et al. 2011, Miller et al. 2011). The Prineville District is estimated to have only 53 percent of historic sagebrush habitat, having lost more habitat than any other BLM district in Oregon (Hagen 2011a). A large proportion was lost to agriculture (Hagen 2011a).

The sage-grouse population in the project area (see Chapter 3 introduction for definition of project area) is part of the central Oregon population and is one of four populations within the Great Basin management zone that includes portions of Oregon, California, and Nevada (Garton et al. 2011). There is a 15.2 percent chance the population will decline below 500 by 2037, and a 91.3 percent chance that fewer than 500 birds will be in the population by 2137 (Garton et al. 2011). Based on counts at 58 lek complexes over the last 30 years the central Oregon population has declined steadily (average -0.004 percent/year) and the trend is the most sustained of all BLM districts (Hagen 2011a). The primary current threat to the central Oregon population is juniper encroachment which reduces habitat suitability and threatens connectivity with other Oregon populations to the south and east (Hagen 2011a, USFWS 2013). Other threats to sage-grouse populations include energy development, recreation, urbanization, and agricultural conversion (USFWS 2013).

Preliminary Priority Habitat (PPH or "core" habitat) and Preliminary General Habitat (PGH) are delineated mapping areas that the BLM incorporates in efforts to maintain and protect large expanses of sagebrush habitat and high densities of sage-grouse (USDI BLM 2011b). These areas are defined and mapped by BLM at
http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html

This conservation approach was developed with state wildlife agencies and combines breeding bird densities and local knowledge of areas of high biological value (e.g., nesting and brood-rearing habitat). PPH represents areas of the highest quality sagebrush habitat that support the highest densities of birds and sustainable populations. PGH denotes sagebrush habitats that contain fewer bird densities, less suitable habitat, and the opportunity for current and future restoration. Fifty-eight percent of the project area is identified as PPH and 42 percent is PGH.

The project focusses on playas, because playas are important for many aspects of the sage-grouse life cycle. Playas are important brood-rearing (early and late) habitat for sage-grouse because they can provide a diversity of plants and insects. Playas also provide winter habitat for local sage-grouse populations, and playas are sometimes used as leks. Detailed information on the importance of playas is in Chapter 3 of this EA. Many of the playas in the project area are limited in plant species diversity and/or have altered natural hydraulic and nutrient cycling processes that are being exacerbated by:

- <u>Encroaching juniper and silver sagebrush:</u> Connectivity across sage-grouse habitat is very important. Expansion of young juniper into sagebrush habitat reduces habitat connectivity both by removing suitable cover and by providing tall structures that attract predators of sage-grouse such as ravens (Doherty et al. 2008, 2010). Silver sagebrush encroachment onto playas reduces plant species abundance and diversity, which alters playa function and reduces playa suitability for sage-grouse.

- Dugouts and concentrated livestock grazing: Playas often serve as water sources for livestock and wildlife; some have been dug out to extend water availability. Livestock concentrate in the playas when water is available, resulting in increased use on plants, trampling of plants, altered nutrient cycles, and soil compaction; this contributes to the diminished ecological condition of the playas.
- Fences: Fences pose a collision hazard for sage-grouse, especially when fences are located close to leks or special areas such as playas.
- Roads and primitive routes: Motor vehicles compact soil, crush plants, and disturb sage-grouse and other wildlife.

The project addresses concerns about playas, but it also addresses concerns about habitat connectivity by treating encroaching juniper outside of playas, for the reasons described in the next paragraph.

We chose this particular area for several reasons. As stated above, the grazing permits were expiring and the area contained a number of threats to sage-grouse habitat. Also, it contains a high density of playas; within the project area there are 217 playas 2.5 acres or larger. Additionally, this project would complement past and ongoing work the BLM has done and is doing in the area. The BLM has already removed young juniper from over 10,000 acres in the project area both in and around playas under two previously approved projects. These previous projects allow BLM to cut juniper throughout the project area except in areas that have wilderness characteristics (see description of wilderness characteristics in Chapter 3 of this EA). This resulted in large blocks between treatments where connectivity is limited and playas are surrounded by young juniper. These areas were excluded because at the time of the previous analysis and decision, national BLM direction was more restrictive concerning cutting juniper in areas with wilderness characteristics.

Purpose of action

There were two main purposes of this project. One is to respond to applications for permit renewal and consider whether or not to renew (with or without modifications) the 10-year livestock grazing permits #3605569, #3605050, #3605623 in accordance with 43 CFR Part 4130. The grazing permits for the Hampton Allotment and ZX Allotment expired in 2014. The Ram Lake Allotment permit will expire in 2016. When issued, grazing permits must also address appropriate terms and conditions designed to "achieve management and resource condition objectives for the public lands…and to ensure conformance with part 4180" (43 CFR Part 4130.3).

A second primary purpose of this project is to improve the ecological condition of playas and surrounding areas for sage-grouse in the Hampton, Ram Lake and ZX grazing allotments.

The purposes below are taken from the BLM's Brothers/La Pine Resource Management Plan (RMP) and Rangeland Program Summary Record of Decision (ROD) (USDI BLM 1989) that directs BLM public land management within the project area. Some of the purposes below mention "riparian areas;" riparian areas are the interface between water and land. Playas in good condition provide riparian habitat. From the RMP:

- … riparian areas will continue to be protected and managed to provide full vegetative potential (page 86).
- … non-game species habitat management will be accomplished by maintenance or enhancement of vegetative structure and diversity (page 97).
- Maintain wildlife habitat and rangeland health through juniper and shrub control (page 88-90).
- Management activities in the habitat of … sensitive species will be designed to benefit those species through habitat improvement (page 121).
- Grazing management … will continue so as to maintain or improve ecological status on all grazing allotments... (page 75).

Additional guidance pertaining to the management of sage-grouse habitat is found in the BLM's Special Status Species Manual (BLM Manual 6840) and BLM's Instruction Memorandum No. 2012-043 (BLM IM 2012-043):

- Actions authorized by BLM shall further the conservation of federally listed and other special status species and shall not contribute to the need to list any special status species under provisions of the ESA, or designate additional sensitive species under provisions of this policy (BLM Manual 6840).
- Maintain, enhance, or restore conditions for Greater Sage-Grouse and its habitat in PPH and reduce and mitigate adverse effects on Greater Sage-Grouse and its habitat to the extent practical in PGH (BLM IM 2012-043).

Decision factors

After considering public input on this EA, the BLM will decide where and whether or not to treat vegetation, fill dugouts, remove livestock grazing from playas, remove livestock grazing from the entire project area, renew grazing permits as-is or with changes in AUMs, use dates or other terms and conditions, create new water sources for livestock to replace ones lost from filling dugouts and fencing playas, or relocate roads and routes out of playas. The decision may be to pick one alternative in its entirety, combine aspects of several alternatives, or select the "no action" alternative.

The BLM's decision will be based on:

- How well the selected alternative addresses the purpose, need and issues.
- Agency (public) cost to implement and maintain the selected alternative, the risk of long term investment in infrastructure, and the potential for the actions to be successful.
- How well the decision conforms to laws, regulations, and policies related to grazing use and protecting other resource values.
- How well the decision promotes maintenance of rangeland health standards.
- How well the decision conforms to ODFW 2011 sage-grouse guidelines.
- How well the decision conforms to IM 2012-043 regarding interim sage-grouse management.

Any decision the BLM issues will explain associated appeal procedures. If the decision includes modification of the livestock grazing permit (e.g., annual begin and end dates, season of use, number of

AUMs, terms and conditions), it will be issued as a Proposed Decision with opportunity for protest prior to issuance of the Final Decision, followed by an opportunity for appeal.

Tribes, individuals, organizations and agencies consulted

The BLM mailed over 50 tribal and public scoping letters in March 2012, and received 12 letters, including ones from the Oregon Department of Fish & Wildlife (ODFW), the USFWS the Blue Mountain Biodiversity Project, Oregon Wild and the Oregon Natural Desert Association, and livestock grazing permittees within the project area. In many cases the comments led to the development of issues (see next section) and the incorporation of project design features into the action alternatives (as described in Chapter 2, Alternatives).

Issues

An issue is a point of disagreement, debate, or dispute with an action based on an anticipated effect. While many issues may be identified during scoping, only some are analyzed in the EA. The BLM analyzes issues in an EA when analysis is necessary to make a reasoned choice between alternatives, or where analysis is necessary to determine the significance of impacts. To warrant detailed analysis, the issue must also be within the scope of the analysis, be amenable to scientific analysis rather than conjecture, and not have already been decided by law, regulation, or previous decision. Significant effects are those that occur in several contexts (e.g., local and regional) and are intense (e.g., have impacts on public health or unique areas).

The following issues about the proposed action (or lack of action) were raised by the public or BLM staff, or both, and are considered in detail in Chapter 3 of this EA:

- How would removal of concentrated livestock use in playas with dugouts affect **plants and soils** when soils are wet?
- How would filling in all dugouts within the selected playas affect the extent and duration of the **inundation of the playas**?
- How would project actions affect **wildlife**, specifically:
  - How would filling dugouts, removing livestock grazing, and reducing silver sagebrush affect **sage-grouse** brood rearing habitat on playas?
  - How would concentrated livestock grazing at proposed water troughs affect **sage-grouse** nesting habitat suitability?
  - What effect would removing encroaching juniper have on **sage-grouse** habitat?
  - How would fences[1] affect **sage-grouse** habitat?
  - How would temporary noise disturbance associated with well drilling and chainsaw cutting affect **sage-grouse** habitat?
  - How would filling dugouts affect **sage-grouse**?
  - How would the loss of free water (from filling dugouts) affect **mule deer, elk and pronghorn** distribution?

[1] Most of the fences are proposed to exclose playas.

  - How would proposed fences affect **mule deer, elk, and pronghorn** habitat?
  - How would temporary noise disturbance associated with well drilling and chainsaw cutting effect **mule deer, elk and pronghorn** during winter?
  - How would the loss of free water affect **bat** distribution?
  - How would filling dugouts affect **waterfowl?**
  - How would livestock concentrations around proposed water sources affect **pygmy rabbits**?
- How would juniper thinning, fences, wells, pipelines and water tanks affect the appearance of naturalness in areas with **wilderness characteristics**?
- How would juniper thinning, fences, wells, pipelines and water tanks affect **visual resources**?
- How would the reduction in permitted grazing use affect the **local economy**?

While a number of other issues were raised during the scoping period, not all of them warranted detailed analysis to make a reasoned choice between alternatives or to determine the significance of impacts. Issues raised but not analyzed in detail are described briefly in Chapter 3.

Chapter 2 Alternatives

Introduction

The action alternatives (Alternatives 2-5) explore different ways to meet the purpose and need for the action. The No Action alternative, Alternative 1, is the only alternative that does not respond to the purpose and need. Alternative 1 would also not conform to a number of policies, as described in the "Conformance" section near the end of this chapter. While the alternatives are separate for analysis purposes, the BLM's decision may include parts from several of the alternatives. The BLM has not identified any one of the alternatives as the "proposed action."

The alternatives are summarized in Table 1 (next page) and displayed on the attached maps (Appendices). Fence, pipeline, well, tank, trough and route adjustment locations shown on maps are approximate. Facilities would be installed in the general location, but may be moved slightly from locations shown on maps to minimize effects on wilderness characteristics and visual, cultural and other resources. BLM would adjust locations if the effects would exceed those analyzed in this EA.

Regardless of the alternative selected, the BLM would continue to cut juniper and mow or crush shrubs, small trees and other vegetation on areas that don't have wilderness characteristics, and burn a portion of these cut areas. This action was previously approved in the May 2011 Decision Record for the High Desert Shrub Steppe (HDSS) environmental assessment (EA), which prescribed 13,600 acres of treatment per year within a 616,600 acre project area that surrounds and includes the entire project area for this current EA. The HDSS EA and Decision Record are available at the Prineville BLM office or on BLM's public website; see address on cover page. The HDSS Decision Record has the following requirements:

- Pile or scatter the downed vegetation.
- Don't cut old trees or trees with cavities or raptor nests.
- Rest these areas from livestock grazing if needed.
- Burn standing live and down vegetation in areas with and without wilderness characteristics.
- Seed or root stock transplant forbs, grass and shrubs, generally on areas also treated mechanically or by prescribed burn.

Table 1. Summary of actions.

ACTION	UNITS		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Encroaching silver sagebrush & juniper	Acres juniper mechanically thinned (maximum) in areas with wilderness characteristics		0	45,589	45,589	45,589	0
	Playas mowed / acres mowed (just ones dominated by silver sagebrush)		0	12 / 890	12 / 890	12 / 890	0
Dugouts & concentrated livestock grazing	Dugouts filled		0	35	35	34	41
	Wells existing/new (each well has 1-3 storage tanks)		3/0	0	3/5	3/5	3/5
	Miles pipeline existing[2]/new		49	0	38/19	39/23	39/23
	Water trough locations (3 troughs per location) existing/new		41/0	0	34/17	41/22	41/22
Fences	Temp. exclosures	Exclosures built	0	0	25	0	32
		Miles new temp. fence	0	0	19	0	34
		Playas not grazed	0	0	25	0	34
		Acres not grazed	0	0	573	0	2,183
	Perm. exclosures	Exclosures built	0	0	6	7	0
		Miles new perm. fence	0	0	13	15	0
		Playas not grazed	0	217	10	9	0
		Acres not grazed	0	143,027	6,493	2,376	0
	Miles fence removed as part of exclosure fencing		0	0	2	1	1
	Miles interior fence removed		0	89	0	0	0
	Miles new pasture division fence		0	0	5	5	0
Livestock grazing permits	Active AUMs[3]	Hampton	6,899	0	6,269	6,725	6,694
		Ram Lake	812	0	788	794	794
		ZX	7,100	0	6,917	7,023	7,023
Roads / routes	Miles closed or decommissioned		0	19	20	16	16
	Miles created		0	8	8	8	8

Alternative 1, No action

Alternative 1 represents the existing condition. The BLM would not treat vegetation, fill dugouts, provide alternate water sources for livestock, modify livestock grazing or realign roads or primitive routes around playas. Existing developments (3 wells, 41 troughs and 49 miles of pipeline) would remain in place.

[2] Existing pipeline in Alternatives 3-5 are less than Alternative 1 because some pipeline would be abandoned.
[3] An AUM is an animal unit month, the amount of forage one cow with calf eat in one month. A grazing permit specifies active preference AUMs, which is the maximum amount available to the permittee each year.

Livestock grazing permits

Under this alternative the BLM would fully process and renew the grazing permits for a 10 year term with the terms and conditions shown in Table 2 and listed below the table.

Table 2. Terms and conditions of livestock grazing permits.

Allotment name and number	Grazing period	Kind of livestock	Active AUMs	Suspended AUMs
Hampton #00003	4/16 – 11/15	Cattle	6899	0
Ram Lake #05245	3/1 – 2/28	Cattle	812	0
ZX #15238	3/1 – 2/28	Cattle	7100	0

Explanation of terms used in the above table:

Grazing period: Use can occur only within these dates.

Kind of livestock: Use can only be with this kind of livestock.

Active AUMs: This is active preference. Actual use can be up to but not over this amount. An AUM is an animal unit month, or the amount of forage a cow and calf eat in one month. Number of cattle X number of months = AUMs. For example, use in Ram Lake could be 812 cattle for one month, or 406 cattle for two months, etc.

Suspension AUMs: Use attached to the permit but not currently available to the permittee. It can be made available if conditions change, e.g., if exclosure fences are removed and the area is once again available for livestock grazing. Use in suspension is re-evaluated when permits are renewed.

Percent public land and number of livestock: These terms are not shown above, but they are included in all grazing permits as a way to account for portions of a pasture that are private land. Only the portion of grazing that occurs on public land is counted towards active AUMs or included on the permittee's bill.

The permits currently include the terms and conditions above as well as the ones below; these would be included in the renewed permits issued under Alternative 1. They apply to all three permits unless otherwise specified:

- All grazing is to be in accordance with the Brothers/La Pine Resource Management Plan and any current Allotment Management Plan, Cooperative Rangeland Management Agreement, or yearly turnout statement if issued.
- Permittees are required to submit Actual Use grazing records within 15 days of completion of the year's grazing use.
- Salting of livestock within one-quarter mile of water is prohibited. Supplemental feeding of livestock on public lands is prohibited without prior authorization from the BLM.
- Permittees are required to maintain all range improvements for which they have maintenance responsibilities.
- Permittees are to provide reasonable access across private and leased lands to the BLM for the orderly management and protection of the public lands as allowed in 43 CFR 4130.3-2 (H).
- The last line of the schedule for the Hampton allotment is for fenced federal range. Fenced federal range is BLM land fenced within and used in conjunction with permittee's private land.
- Within the Hampton Allotment, T23S R20E section 7 is the Benjamin Natural Area and grazing has been permanently excluded from this area.

Alternatives 2-5, Action alternatives

In Alternatives 2, 3, 4 and 5, the "action alternatives," the BLM would take a number of steps to reduce impacts to resources and resource uses. The steps or **"project design features"** (PDF) that would be taken regardless of the alternative selected are listed here:

1. Prior to implementation of any vegetative treatment or ground disturbing activity, field inventory and reporting would be completed in consultation with the Oregon State Historic Preservation Office to meet Section 106 of the National Historic Preservation Act. Through project design, ground disturbing actions would avoid cultural resources and paleontological localities thus removing any impact or effect to these resources.
2. Prior to any treatment, the BLM would complete clearances for locally important or special status animal and plant species. Clearances involve a) identifying which species are potentially present, b) assessing the potential for the action to have an undesirable effect, and c) ensuring all applicable PDFs specified in the Decision Record are applied such that effects do not exceed those analyzed in the EA.
3. Contractors and others implementing actions for this project would be trained to identify raptor nests, cavity nests, ferruginous hawks, goshawks, other raptors, sage-grouse and their nests, and pygmy rabbits and their burrows. Contractors and others would immediately notify the BLM of any such sightings. Vehicles would not be allowed off road within ¼ mile of pygmy rabbit burrows. The BLM would adjust implementation activities as needed to ensure PDFs are applied and impacts remain at or below the level analyzed in the EA for the alternative selected in the Decision Record.
4. All contractors and land-use operators moving surface-disturbing equipment in or out of weed infested areas would be required to clean their equipment before and after use on public land. Contractors would be given noxious weed information at pre-work meetings and asked to report any populations of noxious weeds in or near work areas. Any weed sighting information would be forwarded to the BLM.
5. Project activity would not be allowed from December 1 to April 1 within ½ mile of bald and golden eagle winter roost sites, or from January 1 through August 31 within ¼ to ½ mile of raptor nests, depending on species, as summarized in Appendix B of this EA and described in detail on page 47 in Upper Deschutes RMP (USDI BLM 2005).
6. Pretreatment and treatment activities within mule deer, elk or pronghorn winter range would be completed within a two week window if conducted between November 1 and May 1, depending on species, as summarized in Appendix B and described on page 47 of the Upper Deschutes RMP (USDI BLM 2005).
7. BLM would complete VRM contrast rating worksheets (Visual Resource Contrast Rating Handbook 8431-1, USDI BLM 1986b) during project design to assess the change in contrast due to increased visibility of roads, troughs and other features and adjust treatments as needed to meet or exceed VRM standards. BLM would design treatments to mimic patterns found in the characteristic landscape as well as to improve long distance scenic view opportunities.
8. BLM would ensure that VRM standards from the Brothers/La Pine RMP are met or exceeded.

9. BLM would monitor treatments for spread of weeds or new populations. If weeds are detected, appropriate corrective action would be applied as described in existing BLM guidance. If weeds are detected, appropriate corrective action would be applied as described in the Prineville District Integrated Weed Management Plan (http://www.blm.gov/or/districts/prineville/plans/activityplans.php) or subsequent weed management plan.
10. Seeds would be obtained from a certified weed-free source.
11. BLM would require contractors (as well as BLM staff) to avoid off-road travel while implementing treatments.

Additional PDFs are described below under the individual alternatives.

Alternative 2

Overview

In this alternative, livestock grazing permits would be renewed as-is but only temporarily while BLM completes a plan amendment that would potentially make the entire project area unavailable for livestock grazing. After that, if the area is unavailable for grazing, the three permits would not be renewed, resulting in no grazing on 217 playas without the need for new fence construction. The BLM would also improve sage-grouse habitat by filling in 35 dugouts, reducing silver sagebrush on some playas, reducing juniper cover on over 45 thousand acres, and re-aligning routes so they don't go through playas.

Encroaching silver sagebrush and juniper

The BLM would mow shrubs, small trees and other vegetation on 890 acres on 12 playas dominated by silver sagebrush, and mechanically thin juniper on 45,589 acres, following the PDFs listed above for Alternatives 2-5 as well as these additional PDFs:

- Pile or scatter the downed vegetation.
- Burn standing live vegetation and cut/down vegetation.
- Tree boles would be burned, left on site unburned, or removed (if there is public interest in firewood or wood products).
- Trees near any facility (such as fences and roads) would be directionally felled to avoid damaging or interfering with the function of these facilities.
- Silver sagebrush reduction treatments in PPH would not occur from March 1 to June 30.
- Juniper cutting with chainsaws would not occur within 5.1 miles of the perimeter of an active lek before 10 am during the breeding season (March 1 – June 30).
- Don't cut trees with cavities, raptor nests, signs, or blazes. Don't cut trees with fences attached to them, unless replaced with a fence post.

PPH is preliminary priority habitat for sage-grouse (core habitat) and **PGH** is preliminary general habitat.

- At least four young trees per acre would be left in juniper woodland to provide recruitment trees for when the old trees die. Old growth stands are where there are five or more old growth trees per acre. Cut all juniper in shrub steppe, except old growth trees or other exceptions listed here (e.g., cavity nesting).
- Don't cut juniper with old growth characteristics, or any large ponderosa pines. For the purposes of this EA, old growth juniper are defined by physical characteristics including rounded tops or spreading canopies, dead branches covered with fruiticose lichen, and bark with deep furrows. This would generally mean BLM would not cut cut juniper with diameter at breast height (dbh) >16 in juniper woodlands, or with dbh > 18 in shrub steppe. Large ponderosa pines are those greater than 18 inches in diameter at breast height.
- Cut trees would be directionally felled away from old growth juniper trees.
- Use irregular thinning unit boundaries, disperse trees and slash, and retain a variety of tree ages in order to promote a mottled appearance. Cut juniper six inches or less from the ground. Mow sagebrush in mosaic pattern.
- Juniper cover would be retained in key areas, such as along rock outcrops; in wildlife movement corridors; or areas that have other values important for wildlife. These specific areas would be identified in the clearance process.
- Don't mow or cut in the Benjamin Area of Critical Environmental Concern / Research Natural Area (640 acres in the Hampton Allotment).

The Decision Record for the HDSS EA already covered mowing and thinning in areas without wilderness characteristics in the project area; therefore, this alternative would just treat juniper in areas that do have wilderness characteristics. This EA does not cover seeding or root stock planting on treated areas; that action was already approved in the Decision Record for the HDSS EA.

Dugouts and concentrated livestock grazing

In Alternative 2 the BLM would fill 35 dugouts using soil displaced during original excavation. The filled dugouts would be those where dugout capacity is three percent or more of the total playa capacity. We chose this threshold capacity because this size would allow for the greatest amount of water displacement when/if the dugouts are filled in it would allow for the greatest restoration potential (largest acreage and highest volume of water). Also, when comparing the dugout capacity to playa surface area ratios for all playas we found a natural break at the three percent level where a lot of playa's capacity ratios dropped considerably after three percent. Because this alternative eliminates livestock grazing, existing range developments would no longer be the permittees' responsibility. The unused troughs (41 locations) and storage tanks (1-3 at the three existing wells) would be removed. Portions of pipelines and wells that are visible would be removed; portions underground would be abandoned but left in place. Unused interior fences (89 miles) would be removed (see more detail under *Fences*, below).

BLM would rehabilitate wildlife and livestock trails leading to filled dugouts to a condition that discourages wildlife movement (and livestock in Alternatives 3-5) towards playas. This may involve one or more of the following, or other similar actions: ripping (de-compacting) the soil, planting seeds or transplants, and trimming nearby trees or shrubs and placing that vegetation over the trail.

Dugouts in PPH would be not be filled from July 1 – March 1.

Heavy equipment would be used to fill dugouts. To reduce effects from soil compaction, operate heavy equipment when soils are dry or frozen. Soils are wet when they are at or above field capacity in the top three inches of the soil surface. Cease operations when equipment tracks create ruts greater than or equal to three inches deep with one pass or when equipment is slipping and sliding.

If a road is not available to access the playa/dugout, limit equipment passes to four or fewer trips over a single piece of ground. If five or more trips are likely, designate a single route into the playa/dugout.

Fences

In this alternative, if the area is made unavailable for livestock grazing and the permits are not renewed (see Livestock grazing permit section below), the BLM would remove 89 miles of interior pasture fences since they would no longer be needed in the absence of livestock grazing. The allotment boundary fences would remain in place since livestock still graze on adjacent allotments. The adjacent permittees would continue to maintain adjacent allotment boundary fences, and BLM would continue to maintain exclosure fences when cattle are present in adjacent pastures.

Livestock grazing permits

The grazing permits would be renewed exactly as described for Alternative 1, except a) they would only be renewed for a two year term, and b) they would include a new term/condition that the permit would be renewed for additional two year terms unless the area is made unavailable for grazing in a future RMP amendment. If the area is made unavailable, the permits would not be renewed. At that point, the permittees would no longer have grazing permits; therefore they would not be responsible for maintenance of fences or other range developments. The BLM would be responsible for maintaining exclosure fences.

Roads and primitive routes

In this alternative the BLM would decommission (close and rehabilitate) 19 miles of primitive routes in and around playas, and create eight miles of new primitive routes so that the routes go around instead of through playas.

Decommissioning routes would involve one or more of the following, or other similar actions: ripping (de-compacting) the soil, planting seed or transplants, and trimming nearby trees or shrubs and placing that vegetation over the route.

Creating new routes in areas with wilderness characteristics would involve “minimum tool.” For example, create route by driving over the area with a truck multiple times instead of using a bulldozer or other heavy equipment.

In locations where trails or roads are visible or potentially visible as part of a wide, panoramic view, consider locating treatment edges at or near these routes, to avoid routes bisecting cleared areas.

Identify existing and proposed trail and right of way routes prior to vegetation management treatments to ensure sufficient screening vegetation would be left to meet or exceed VRM standards. A 300 foot untreated buffer would be left around existing motorized travel routes.

Meander new routes so viewer does not see a straight line, and camouflage routes to be closed through vegetative plantings, or rocks, if adjacent to closed route.

Alternative 3

Overview

In this alternative, the BLM would renew all three livestock grazing permits. The BLM would improve sage-grouse habitat by filling in 35 dugouts (same as Alternative 2) and removing concentrated livestock grazing on some playas by constructing temporary exclosures around 25 playas and permanent exclosures around 10 playas. The BLM would install new watering locations for livestock prior to filling in dugouts and fencing playas. The BLM would also improve sage-grouse habitat by reducing silver sagebrush and juniper in the same manner and amount as in Alternative 2, and re-aligning routes out of playas similar to Alternative 2 (one more mile decommissioned).

Encroaching silver sagebrush and juniper

Vegetative treatments would be the same as those described in Alternative 2: mow shrubs, small trees and other vegetation on 890 acres on 12 playas dominated by silver sagebrush, and mechanically thin juniper on 45,589 acres. The design features and stipulations for these actions are listed in Alternative 2.

Dugouts and concentrated livestock grazing

Dugouts would be filled in the same manner and amount as described in Alternative 2 (fill 35 dugouts) but the timing of implementation may be somewhat delayed since, under this alternative, BLM would provide replacement water for livestock before filling dugouts or fencing playas.

The BLM would install five new water wells to lessen impacts to livestock, as well as wildlife, from water lost by filling dugouts and/or fencing playas. These five new wells would each include one to three storage tanks at or near the well, in a location that would allow gravity to fill troughs. The storage tanks would be large enough to store water to support livestock for three days. Water would be pumped from the wells to the tanks via portable generator when cattle are in the pasture. The water from these tanks would be gravity fed using 19 miles of new and 53 miles of existing pipeline to 17 new trough locations (each about ½ acre), with one to three troughs per location. Up to seven existing troughs would be removed to benefit sage-grouse by reducing acres receiving concentrated grazing. This would only be done where there are enough troughs to continue to serve livestock. The new pipeline sections would be placed on top of the ground, except when crossing vehicle routes.

New troughs would be located at least 150 feet from fences to reduce bird and bat collisions. New troughs would be located at least 0.75 miles from playas that contain dugouts, unless the dugouts are fenced to exclude livestock grazing. No new troughs would be located within 0.25 mile of pygmy rabbit home range (BLM would conduct surveys prior to trough placement). The BLM would install ramps in all water troughs to allow wildlife to gain access to and escape from the water.

Water tanks or troughs in areas with wilderness characteristics or visible from a key observation point would be painted to match surrounding vegetation. The BLM would place pipelines next to existing primitive routes, locate well buildings and water storage tanks in areas with juniper trees, and limit well housings to height of adjacent vegetation when possible.

Fences

This alternative would include BLM installation of:

- Twenty-five temporary exclosures to exclude livestock grazing from 573 acres, including 25 playas. This would involve 19 miles of new temporary fence (removed within seven years).
- Six permanent exclosures to exclude livestock grazing from 6,493 acres, including 10 playas. This would take 13 miles of new, permanent fence, and would involve removing two miles of existing fence. The entire Canary Lake Pasture in the Hampton Allotment would be a permanent exclosure (2,658 acres).
- Five miles of permanent cross fence in the Hampton Allotment to create four pastures out of two. Cross fences are fences installed inside a perimeter fence to divide a grazing area into two or more separate pastures.

Temporary fences around playas would allow the same vegetative recovery as permanent fences, but would not present a permanent obstacle for wildlife or a permanent visual intrusion.

Fences would be constructed as directed in BLM Handbook H-1741-1. The BLM would install reflectors on fences within 1.25 miles of leks to reduce sage-grouse hitting fences. Fences would be constructed at least 100 feet outside of playas. The BLM would maintain exclosure fences.

Livestock grazing permits

The BLM would initially issue grazing permits for ten years with the same terms and conditions as Alternative 1, except for the addition of the following three terms/conditions: 1) Grazing period will be March 1 through November 15 in all three allotments, 2) Grazing system will be as specified in the Decision for this EA (see table below), and 3) Once the BLM has provided alternate water to replace exclosed areas, and the larger, permanent exclosures are constructed on selected playas, the permit will be modified to place some active AUMs in suspension to reflect the decreased land available for livestock grazing. The AUMs in suspension are attached to the permit but not currently available to the permittee. It can be made available if conditions change, e.g., if exclosure fences are removed. The result of these changes is shown in the table below. There may also be minor changes to the percent public land shown on the permit to reflect more accurate recent information on land ownership.

Table 3. Alternative 3 grazing permits after installation of replacement water and exclosure of playas.

Allotment name and number	Grazing period	Kind of livestock	Active AUMs	Suspended AUMs	Grazing system
Hampton #00003	3/1 – 11/15	Cattle	6,261	630	Deferred rest rotation
Ram Lake #05245	3/1 – 11/15	Cattle	788	24	Deferred rest rotation
ZX #15238	3/1 – 11/15	Cattle	6,911	183	Season long + rest

Deferred rest rotation means each pasture in the allotment is not grazing until after critical grass growing period (about July 1) one out of every three years. Season long + rest means the permittee will be in four of the six pastures for the duration of their permitted use, with the other pastures being completely rested; use and rest pastures are rotated each year.

The AUM placed in suspension account for forage in exclosures no longer available to livestock. The calculation assumed forage on an acre of playa was equivalent to an acre of upland. This assumption was used as a baseline to compare the alternatives since accurate forage production estimates are not available. The BLM would review existing and new data on current and potential forage prior to making final changes to permits; the figures used in the EA alternatives (and any carried through into the Decision) are the maximum reduction that would occur; that is, the amount of AUMs put into suspension could be less (but not more) than the amount set out here. A preliminary look at 1964 range survey data (available at Prineville BLM office) shows playas were less productive than surrounding areas at the time of the surveys.

After vegetation treatments, livestock grazing may continue in pastures if the disturbance event did not result in undesirable soil or vegetative conditions, or if grazing would not impede site recovery. For example, livestock exclusion after disturbance events would not be required if livestock are not trailed through the affected area, and attractants (e.g., water, mineral supplements, salt) are not provided within one mile. Attractants may be closer if physical barriers (e.g., rimrock, fences) prevent livestock access to the affected area. In pastures where playas are mowed and then seeded, but livestock have not been fenced out of the area, the BLM would coordinate the seedings with the scheduled rest or deferment. This would maximize seedling establishment. In addition, all seedings planned for a pasture would take place in one year to lesson change to the grazing system.

Roads and primitive routes

Reroute primitive routes around playas in the same manner as described above under Alternative 2. In this alternative the BLM would close 20 miles (one more than Alternative 2) and create 8 miles (same as Alternative 2). The one additional mile closed is a result of the difference in playa exclosure size – Alternative three has the most and largest exclosures, so there were more roads inside these fenced areas that needed to be closed.

Alternative 4

Overview

In this alternative, the BLM would renew all three livestock grazing permits. The BLM would improve sage-grouse habitat by filling in 34 dugouts (one less than in Alternatives 2 and 3) and removing concentrated livestock grazing by constructing permanent exclosures around nine playas (in contrast to Alternative 3 where BLM also constructed temporary exclosures around 25 playas). The BLM would install new watering locations for livestock prior to filling in dugouts and fencing playas. The BLM would also improve sage-grouse habitat by reducing silver sagebrush and juniper in the same manner and amount as Alternatives 2 and 3, and re-aligning routes out of playas similar to Alternatives 2 and 3 (except only decommissioning 16 miles instead of 19 or 20).

Encroaching silver sagebrush and juniper

This would be the same as in Alternative 2 and 3: mow shrubs, small trees and other vegetation on 890 acres on 12 playas dominated by silver sagebrush, and mechanically thin juniper on 45,589 acres. The design features and stipulations for these actions are listed in Alternative 2.

Dugouts and concentrated livestock grazing

This part of Alternative 4 would be the same as Alternative 3 (five new wells, 19 miles existing pipeline, 53 miles new pipeline), except for the following differences:

- Only 34 dugouts would be filled instead of 35. The one fewer filled dugout is because one of the playas with two dugouts would have one dugout filled, while the other remains as a livestock and wildlife water source. The BLM would build an exclosure fence around the filled dugout, while leaving the other dugout unfenced.
- There would be 22 new trough locations, as opposed to the 17 in Alternative 3.

Fences

Under this alternative there would be <u>no temporary exclosure fences</u>, only permanent ones. The permanent exclosures would be similar to Alternative 3, except for the following differences:

- There would be seven permanent exclosures (one more than in Alternative 3), excluding grazing from 2,376 acres, including nine playas.
- The permanent exclosures would be smaller than in Alternative 3, but would require more new fence (15 miles of new permanent exclosure fencing in this alternative versus 13 miles in Alternative 3).
- One mile of existing exclosure fence would be removed.
- Only part of the Canary Lake Pasture in Hampton would be a permanent exclosure (510 acres).

As described in Alternative 3, BLM would install five miles of new cross fence in the Hampton Allotment, splitting two pastures in half (approximately) so that more pastures can be rested from grazing each year. As in Alternative 3, the BLM would maintain exclosure fences.

Livestock grazing permits

This part of Alternative 4 would be the same as Alternative 3 except for the number of active AUMs and AUMs placed in suspension. There would be fewer AUMs placed in suspension once the exclosures are constructed compared to Alternative 3, because the exclosures would be smaller and fewer. As with Alternative 3, the AUM reductions would come from forage no longer available to livestock because of the large permanent exclosure fences. And as with Alterative 3, changes would be effective immediately except AUM reductions would not be incorporated into the permits until the exclosure fences are constructed and replacement water is provided. The result of these changes is displayed in the table below.

Table 4. Alternative 4 grazing permits after installation of replacement water and exclosure of playas.

Allotment name and number	Grazing period	Kind of livestock	Active AUMs	Suspended AUMs	Grazing system
Hampton #00003	3/1 – 11/15	Cattle	6,725	174	Deferred rest rotation
Ram Lake #05245	3/1 – 11/15	Cattle	794	18	Deferred rest rotation
ZX #15238	3/1 – 11/15	Cattle	7,023	76	Season long + rest

Roads and primitive routes

The miles of new route would be the same as in Alternative 3 (eight miles), but since the exclosures are smaller than in Alternative 3, there would be fewer miles of closed/decommissioned routes around playas (16 miles). The BLM would reroute primitive routes around playas in the same manner as described above under Alternative 3.

Alternative 5

Overview

In this alternative, the BLM would renew all three livestock grazing permits. The BLM would improve sage-grouse habitat by filling in 41 dugouts (more than any other alternative) and removing concentrated livestock grazing by constructing temporary exclosures around 34 playas. None of the exclosures would be permanent. The BLM would install new watering locations for livestock prior to filling in dugouts and fencing playas. The BLM would also improve sage-grouse habitat by re-aligning routes out of playas in the same manner and extent as Alternative 4. The BLM would not improve sage-grouse habitat by cutting any juniper or mowing any silver sagebrush, but this would prevent reductions in the appearance of naturalness in areas with wilderness characteristics as a result of juniper cuts (there would still be impacts from water developments and fences).

Encroaching silver sagebrush and juniper

In this alternative there would be no vegetative treatments, the same as Alternative 1.

Dugouts and concentrated livestock grazing

In Alternative 5 the BLM would fill all the dugouts that are being filled in Alternatives 2 and 3 as well as all dugouts in playas within large exclosures, regardless of whether they meet the three percent criteria listed in Alternative 2. This is being done because the large exclosures are temporary and the thought is that if we don't remove the water source from the playa, fencing them out for a short time in an attempt to change livestock watering behavior would be pointless because livestock would go back to the dugout.

This alternative includes water developments for livestock the same as those proposed in Alternative 4 (five new wells, 23 miles of new pipeline, and 22 new trough locations), except for the following difference: The new water pipe would be buried 2-6 inches in areas of sensitive visual resources, in areas with wilderness character, and in areas where vandalism is a concern.

Fences

This part of the alternative would be the same as Alternative 3, except for the following differences:

- There would be no permanent exclosures.
- There would be 32 temporary exclosures (seven more than Alternative 3, because permanent exclosures from Alternative 3 would become temporary exclosures). These exclosures would preclude livestock grazing on 2,959 acres on 29 playas.

As in Alternatives 3 and 4, the BLM would maintain exclosure fences.

Livestock grazing permits

The BLM would issue grazing permits with all of the same terms and conditions described above for Alternatives 3 and 4, except for changes in the number of AUMs active and placed in suspension. The permits would have fewer AUMs placed in suspension than in Alternative 3, and slightly more than in Alternative 4. In this alternative, the exclosure fences are temporary, so the AUMs would only be placed in suspension temporarily, while in Alternatives 3 and 4 the suspension would be in effect at least until the permit is renewed in ten years. As with Alternatives 3 and 4, most changes would be immediately incorporated into the new permits, but AUM reductions would not be incorporated into the permits until the exclosure fences are constructed and replacement water is provided. The result of these changes is displayed in the table below.

Table 5. Alternative 5 grazing permits after installation of replacement water and exclosure of playas.

Allotment name and number	Grazing period	Kind of livestock	Active AUMs	Suspended AUMs	Grazing system
Hampton #00003	3/1 – 11/15	Cattle	6,694	205	Deferred rest rotation
Ram Lake #05245	3/1 – 11/15	Cattle	794	18	Deferred rest rotation
ZX #15238	3/1 – 11/15	Cattle	7,023	76	Season long + rest

Roads and primitive routes

For motorized use, this alternative would be the same as Alternative 4: Reroute roads/routes around playas by decommissioning/closing 16 miles and creating 8 miles.

Conformance with BLM land use plan and other policy or regulation

Alternative 2 would not conform to the Brothers/La Pine RMP (USDI BLM 1989) because it would remove grazing from an area that is available for grazing (pages 76 – 79, USDI BLM 1989). Therefore, if this action from Alternative 2 is selected, the Brothers/La Pine RMP would need to be amended, which would involve additional public involvement and environmental analysis.

All other actions proposed in the alternatives, including grazing permit renewal, juniper and silver sagebrush thinning, playa restoration, fences and water developments would follow direction from the Brothers/La Pine RMP (USDI BLM 1989), including the following quotes from pages 86-90:

- Mosaic patterns will be incorporated into all control projects.
- All actions will be consistent with the BLM's Visual Resource Management criteria. The management criteria for the specific visual class will be followed.

- In crucial wildlife habitat...work will be scheduled during the appropriate season to avoid or minimize disturbances.
- Surface disturbance at all project sites will be held to a minimum.
- Where exceptional riparian habitat potential does exist, measures … will be taken to provide both livestock water and riparian improvement.

All alternatives (except Alternative 1, the No Action Alternative) would be consistent with BLM Instruction Memorandum 2012-043 (BLM IM 2012-043) which provided interim direction for management of sage-grouse habitat until the land use plan for the area was amended to include more stringent regulatory mechanisms to protect sage-grouse habitat., The BLM would also comply with this IM by "…monitor[ing] activities and projects using the BLM core indicators and protocols…to ensure that the objectives are being met" and "…prioritize[ing] use supervision and effectiveness monitoring of grazing activities to ensure compliance with permit conditions and that progress is being made on achieving land health standards."

The action alternatives are consistent with the Oregon Department of Fish and Wildlife's Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (Oregon Conservation Strategy, Hagen, 2011a) because they include actions listed as conservation guidelines in that document. For example, the Oregon Conservation Strategy says (page 104), "For playas, wetlands, and springs that have been hydrologically modified for livestock watering, local working groups should identify water improvements that have population limiting implications. These should be rehabilitated and off-site livestock watering facilities developed; new water should be available before existing water is eliminated." Another conservation guideline this EA's alternatives are consistent with is the one that calls for juniper removal to promote the return of sagebrush, native grasses and forbs (page 105).

Chapter 3 Affected environment and effects

Introduction

The project area includes over 223 square miles (143,000 acres) of public land in the southeast corner of Deschutes County and northeast corner of Lake County, along the southern edge of land managed by the Prineville District BLM.

The project area occurs in the Northern Basin and Range Ecoregion, which exhibits extreme fluctuations in daily and seasonal temperature and is the driest ecoregion in Oregon (ODFW 2006). The climate is a result of a rain shadow effect that is created by the Cascade mountain range. Average temperatures during the warmest month (July) reach 62.6°F, while average temperatures during the coldest month (December) drop to 26.6°F. Annual precipitation averages 9 – 11 inches (1971 – 2000) and occurs primarily during November – January in the form of snow and as rain during May – June. The majority of the project area is located between 4,400 and 4,900 feet and is relatively flat terrain except for a few buttes (5,600 feet) that occur along the southern project boundary.

The project is focused in and around playas. Playas occur in the depressions on the landscape, and serve as collection points for local surface runoff. Forty nine of the 217 playas within the project area were altered for the purpose of livestock watering between the 1950s and 1970s. This was accomplished by excavating a dugout in the bottom of the playa so that rainwater and snowmelt could be retained for a greater portion of the year to provide livestock water. These 49 playas cover 2,563 acres. Water that would have previously spread out over the surface of the playa now drains into the center pit. This modification makes water available to livestock for a longer period of time each year. Use by livestock is greatest closest to water sources and decreases with increased distance from water (Holechek et al. 2004). Placing the water source for livestock (the dugout) in the middle of the playas has concentrated use there.

As mentioned in the Chapter 1 need section and the Chapter 2 plan conformance section, the BLM has conducted rangeland assessments in the three allotments to determine if the standards for rangeland health are being met. The five standards (USDI BLM 1997) are:

1. **Watershed function – uplands:** Upland soils exhibit infiltration and permeability rates, moisture storage and stability that are appropriate to soil, climate and landform.
2. **Watershed function – riparian/wetland areas:** Riparian-wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.
3. **Ecological processes:** Healthy, productive and diverse plant and animal populations and communities appropriate to soil, climate and landform are supported by ecological processes of nutrient cycling, energy flow and the hydrologic cycle.
4. **Water quality:** Surface water and groundwater quality, influenced by agency actions, complies with State water quality standards.

5. **Native, threatened, endangered, and locally important species:** Habitats support healthy, productive and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate and landform.

Both Hampton and ZX Allotments were found to be meeting all five standards for rangeland health, though above average rainfall just prior to the 2006 assessments may have masked problems in playas. Ram Lake Allotment was found to be meeting Standards 1 and 4 but not Standards 2, 3 or 5 in 2006. Livestock were contributing to the failure to meet Standards 2 and 5, but other causes were implicated in Standard 3. The BLM and the grazing permittee modified grazing practices in 2007 to address the failure to meet Standards 2 and 5. The rangeland health assessments are available upon request from the Prineville BLM. Current grazing for the three allotments is summarized in Table 1 in Chapter 1, and described in the Economics section, below. Effects of the alternatives are described below.

Soils

How would removal of concentrated livestock use in playas with dugouts affect plants and soils when soils are wet?

Affected environment

Playa soils are typically fine textured, deep, somewhat poorly to very poorly drained, and neutral to mildly alkaline. Surface textures range from silt loam to clay, and overlay a clay subsoil (USDA NRCS 2005). The slow permeability of the clay subsoil allows water to accumulate to create perched water tables and prolonged seasonal ponding (Thorne 1981). Occasionally soils are also saturated from below due to the presence of a seasonal high water table. Depth and duration of ponding depends on temperature (warmer temperatures mean more evaporation), annual variation in precipitation and extent of run-off from surrounding uplands.

Disturbance such as concentrated livestock use favors silver sagebrush and creeping wildrye over bunchgrasses and encourages native increasers (plants that increase after disturbance, e.g., povertyweed and evening primrose) and non-native species. As perennial bunchgrass composition decreases and silver sagebrush increases, vesicular crusts also become more common on the soil surface due to reduced organic matter inputs. Vesicular crusts slow infiltration, increase water loss to evaporation, and inhibit seedling establishment of native forbs and grasses, further facilitating the dominance of the native increasers and the non-native species (USDA NRCS 2013).

Impacts of disturbance are greatest when soils are wet. Loam and clay loam soils are very susceptible to compaction and displacement when wet. The shrink-swell properties of these soils can help to mitigate compaction over time if the disturbance is removed. Plants are also most susceptible to trampling when soils are wet since the soil is easily displaced around the plant or plants are easily buried in the soft soil. Wet soil conditions also tend to correspond to the plant's growing season when new growth is vulnerable to damage.

Detailed background information on each playa in the project area is in the project record and available upon request.

Effects

This analysis looks at effects on soils in playas within the project area. Since the dugout attracts cattle which cause concentrated use in the playas, it is assumed that removing the dugout (filling it in so it no longer serves as a water source) or removing access by fencing the playa would remove concentrated use. Livestock are still likely to graze playas, but not at the concentrated levels seen with a dugout present. Other actions proposed in this EA (e.g., juniper cuts, silver sagebrush removal, removal of routes through playas) are expected to increase the amount of water and/or reduce soil compaction on playas, but not to a known or measurable degree. The effects of those actions on playa soils are therefore not considered here in detail.

Alternative 1 (the no action alternative) would have the most acres of playa with concentrated use when soils are wet because no dugouts would be filled and no playas fenced. Under this alternative, the 49 playas with dugouts (2,563 acres) would continue to receive concentrated livestock use when soils are wet. Alternative 2 would protect these 49 playas by removing livestock grazing from the entire project area. In Alternatives 3 and 5, 36 playas (2,295 acres) would have dugouts filled or be permanently fenced. Alternative 4 would protect 35 playas (2,182 acres) by filling the dugouts or permanently fencing them.

Cumulative effects:

Effects from ongoing and future actions that would combine with effects of the current proposed action include nearby juniper treatments (including up to 13,600 per year under the HDSS Decision Record), and continued juniper encroachment. Juniper treatments would increase the amount of water reaching playas (since juniper would use and intercept less water), thereby improving soil conditions on playas; allowing juniper expansion would have the opposite effect. “The estimated acres of juniper forest and savanna in Oregon have increased dramatically since the 1930s from about 1.5 million acres to around 6.5 million acres. Area classified as juniper forest has increased from 420,000 acres to over 3 million. Over 1 million acres of area classed as juniper savanna have more than 25 trees per acre. Over one-third of the acres classed as savanna had seedlings. All indications are that the area of juniper forest will continue to increase” (Azuma et al. 2005). As stated above, juniper cuts would be expected to increase water available on playas, but the extent of the increase from cuts or from continued juniper encroachment are not measurable and therefore not described here in detail.

Hydrology

How would filling in dugouts within the selected playas affect the extent and duration of the inundation of the playas?

Affected environment

This section builds on the information presented above in the Soils section, and the analysis area is the same. The playas located within the project area are characterized as seasonal wetlands that can hold water or snow during parts of the winter and spring but generally dry up in the summer months. The quantity of water stored within the playas can change dramatically from season to season and from year to year. As a result of dugouts, the hydrologic function of the playas was compromised, and the area of

playa inundated with water was reduced. While the exact number of acres currently inundated with water is not known, the BLM estimates average water availability per playa is 1,217.3 acres for 73.4 days past April 15. This would be expected to continue unless active changes are made to dugouts.

Effects

The proposed action that would affect this environment is the filling of 35 to 41 dugouts (depending on alternative) in an attempt to restore the playas to an undisturbed hydrologic state, where the playas are inundated with water over a larger area and for a longer time.

In order to perform this analysis, the BLM made several assumptions. The first is that in a normal year, the depth of water within the playa will be half the maximum depth of the playa, with the dugout present. This is consistent with field observations BLM staff have made over the past several years. The second is that the water within the playa will reach its maximum extent on April 15 and its minimum on October 15 and that all water lost from the playas and dugouts occurs through evaporation, not accounting for soil infiltration or livestock use. During 2007, the BLM completed surveys on 73 playas within the Prineville BLM, including 60 playas within the project area. These surveys included measuring area and depth of both the playa and the dugout if a dugout is present. These measurements were used for the analysis when possible, but there was not data for all playas proposed for restoration. In these cases, we estimated the playas to have the same dimensions and dugout dimensions of a playa of similar size and number of dugouts. The BLM created a model to calculate the volume of water within the playa and evapotranspiration and precipitation data was collected from a weather station at Brown's Well, a site near the project area. The model estimated acres of inundation for each playa, and duration of inundation past April 15. This date was chosen since it is difficult to know when playas begin to be inundated in the fall/winter, but by April 15 all playas are inundated.

The effects described below focus on just the 33 playas that have dugouts that would be filled in one or more alternatives, not all 49 playas with dugouts within the project area. The analysis focuses on extent (acres) and duration (days past April 15) of inundation, not on how this increased water availability would affect playa vegetation and thus condition rating. Effects on playa vegetation and wildlife habitat are addressed in other sections in the EA.

In Alternative 1, no actions would occur and playas with dugouts would be left as is. The playas would continue to be inundated with water on 1,217.3 acres for an average of 73.4 days (past April 15) per playa.

In Alternative 2, 28 playas would be restored by filling in 35 dugouts. Because the decreased volume that is currently occupied by the dugouts would be displaced into the playa itself, additional acreage would be inundated. The result would be 72.8 additional acres of inundation across the project area. The smaller playas with large or multiple dugouts would experience the greatest change in inundation. The water that is pushed out of the dugout and into the playa itself once the dugout is filled will be ecologically beneficial to the playa. In this alternative, once the playas are restored, they would be expected to hold water, on average, 16.7 days longer than current conditions. However, once this occurs, water that would remain in the dugout over a much longer timeframe and is available for

livestock and wildlife will no longer to present. With the loss of the dugout and its water holding capabilities, the sites would average 99.5 more days without water than existing conditions.

In Alternative 3, the dugouts to be filled and playas to be restored are the same as Alternative 2, yielding the same effects.

Alternative 4 is the same, as far as filling in dugouts, as Alternatives 2 and 3, except that only one of the two dugouts within Paiute Lake would be filled. This analysis assumes the two dugouts were of equal size and depth. In this alternative, an additional 70.7 acres would be inundated following the filling of the dugouts. Water would be present within the playas an average 15.6 days longer than current conditions but would be absent from the dugouts an average of 100.6 days longer.

In Alternative 5, 33 playas would be restored by filling in 41 dugouts. This would result in an additional 91.9 acres of inundated playas within the project area, compared to the existing situation. The playas would hold water an average of 14.2 days longer and would be absent from the dugouts an average of 96.7 days longer.

Cumulative effects: There are no other proposed projects or ongoing activities that would affect the extent or duration of inundation of playas.

Wildlife

Introduction

The introduction of the wildlife issues analysis is divided into six sections and begins with a description of the wildlife habitats and species that inhabit the project area. Next, the ecological condition of wildlife habitats, past management actions, and disturbances is discussed. Then, a general overview of the wildlife issues introduces the primary component of this section and prepares the reader for a more detailed analysis of the issues. The basic definition of the focal species concept that is often applied to landscape restoration and the focal species used for this analysis is also discussed.

When data was lacking and obtaining the data would be prohibitively expensive or time consuming, we made assumptions. These are explained within each issue, as necessary.

Wildlife habitat and species

There are a suite of plant communities that form three major wildlife habitats in the project area: shrub-steppe, old-growth juniper woodlands, and playas (Table 6). Shrub-steppe habitat is widespread in the ZX and Hampton allotments and comprises 69 percent (98,177 acres) of the total project area. Old-growth juniper woodlands make up the second largest wildlife habitat (38,571 acres) and are most common in the Ram Lake allotment, but form extensive stands in the southeast corner of the ZX allotment and to the east in the Hampton allotment. Playa habitat contributes the least amount of acres in the project area, totaling 4,266 acres (three percent). The largest playas are located along the southern project boundary and the highest densities occur in the Hampton Allotment.

Table 6. Acres of historical habitat types in allotments in the project area.

Habitat Type	ZX	Ram Lake	Hampton	Total	Percent of total project area
Shrub-steppe	54,559	4,451	39,167	98,177	69
Old-growth juniper woodland	19,745	8,176	10,650	38,571	27
Playa	1,846	391	2,029	4,266	3
Unknown	338	120	1,256	1,714	1
Rock Outcrop	0	0	299	299	0.2

Shrub-steppe habitats are defined as those ecological sites that contain a shrub and perennial grass component and there are less than five old-growth trees per acre for the site. Shrub-steppe habitat includes acres that are encroached by post-settlement juniper. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and low sagebrush (*Artemisia arbuscula*) are the dominant sagebrush species in shrub-steppe habitats within the project area. Both sagebrush species occur most often with Idaho fescue (*Festuca idahoensis*) and to a lesser extent bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needle grass (*Achnatherum thurberianum*), western needlegrass (*Achnatherum occidentale*), and prairie Junegrass (*Koeleria macrantha*). The most common forbs in these habitats are: common yarrow (*Achillea millefolium*), desert parsley (*Lomatium* spp.), pussytoes (*Antennaria* spp.), fleabane (*Erigeron* spp.), milkvetch (*Astragalus* spp.), lupine (*Lupinus* spp.), phlox (*Phlox* spp.), and buckwheat (*Eriogonum* spp.). Antelope bitterbrush (*Purshia tridentata*) grows in varying proportions with mountain big sagebrush and Idaho fescue throughout the project area.

Wildlife species distribution in shrub-steppe habitats is often influenced by the type, number, structure, condition, and patch size of vegetation (Bradford et al. 1998, Vander Haegen et al. 2000, Williams et al. 2011). Habitat selection varies between species that occur in shrub-steppe, but generally large, intact patches of medium to tall sagebrush dominated areas in fair to good condition provide habitat to sustain viable populations (Knick and Rotenberry 1995). In the Great Basin, shrub-steppe habitats are used by more than 350 wildlife species (Wisdom 2005a). Of these, 22 birds and 27 mammals are closely associated with shrub-steppe habitats meaning they depend on sagebrush habitats for part or their entire life cycle (Vander Haegen et al. 2001). Sage-grouse, sage and Brewer's sparrow, sage thrasher, prairie falcon, ferruginous hawk, black-tailed jack rabbit, pronghorn, and several small mammals are some of the closely associated sagebrush species that have been documented in the project area. Pygmy rabbits are closely associated with shrub-steppe habitats, but have not been identified in the project area.

Old-growth juniper woodlands are defined as those ecological sites that contained a juniper component prior to European settlement with greater than five pre-settlement trees per acre for the site. Pre-settlement trees display characteristics such as deeply furrowed bark, rounded tops, large low spreading branches, and fruticose (shrub-like) lichen (Miller et al. 2005). Old-growth juniper woodlands are typically dominated by old-growth western juniper trees, low sagebrush and Idaho fescue, although

mountain big sagebrush occurs at smaller scales with western juniper throughout the project area. Old-growth juniper woodlands contain a suite (variety) of secondary grasses and forbs similar to shrub-steppe habitats.

Townsend solitaire, mountain bluebird, gray flycatcher, native ungulates (mule deer, elk, pronghorn), and many small mammals including several bat species are some of the species associated with old-growth juniper woodlands in the project area. Old-growth juniper woodlands provide nesting habitat for raptors and cavities for birds and small mammals, and more cover for native ungulates compared to shrub-steppe habitats.

Playas are isolated seasonal wetlands located within the larger upland shrub-steppe and old-growth juniper woodland habitats. Playas in the project area range from less than one acre to greater than 600 acres. Plant communities at playas are uniquely different than the immediate uplands, due to the adaptations of playa plant species to tolerate water inundation for longer and more frequent periods than upland plants. As a result, playa vegetation provides high quality forage for wildlife after upland plants have dried out. The density of forage offered at playas may increase the foraging efficiency of many wildlife species. Migratory shorebirds occupy playas during spring migrations to feed on invertebrates. Waterfowl rest at playas with dugouts during spring and potentially fall migrations when water is present. In addition to shorebirds and waterfowl, many of the species that are closely associated with shrub-steppe and old-growth juniper woodlands are closely associated with playas because playas are located within the other two larger habitats.

Natural water sources are limited throughout the project area to playas that do not contain dugouts. Annually, these water sources are unpredictable, providing water for only a short duration or not at all. Several artificial water developments (guzzlers, troughs, dugouts) have been established and provide a more reliable water source than natural playas. Artificial water development density is greatest in the Hampton allotment and least in the ZX allotment. Many species such as bats, waterfowl, and mule deer have extended their use period and possibly expanded their distribution due to these artificial water developments (Krausman, et al. 2006).

Ecological condition

This section describes the existing conditions of upland wildlife habitats (e.g., shrub-steppe and juniper woodlands) from reports compiled during Sage-grouse Habitat Assessments (SGHA) and Ecological Site Inventories (ESI). Existing conditions of playa habitats, including how they have been affected by dugouts, silver sagebrush encroachment, and concentrated livestock grazing, is discussed in the issues analysis section.

In the ZX allotment, SGHA were used to describe sage-grouse habitat suitability, but in Ram Lake and Hampton allotments, Ecological Site Inventories were conducted to describe the ecological condition. Although these two inventories assess different ecological attributes, they both use vegetation cover as an indicator. The SGHA canopy cover estimates averaged across the ZX allotment indicate the three functional groups (shrubs, grasses, forbs) are well within the range of natural variability and provide

suitable year round upland conditions for sage-grouse. Ecological Site Inventory cover estimates suggest forb cover is low in the Ram Lake allotment and sagebrush cover is marginal in the Hampton allotment for sage-grouse, but probably within the range of natural variability. Overall, data indicates vegetation cover, composition, structure, and ecosystem function in shrub-steppe and juniper woodland habitats are intact (Table 7). Annual grass cover is low and is not a major component of habitat degradation in the project area. The primary threat to wildlife habitats is post-settlement juniper encroachment, particularly in shrub-steppe habitats.

Table 7. Vegetation cover (percent) in the ZX, Ram Lake, and Hampton Allotments, average (and standard deviation).

Indicator	ZX	Ram Lake	Hampton
Sagebrush cover	25 (9.6)	16.3 (7.6)	13.5 (7)
Grass cover	21.6 (11.1)	24.5 (8.9)	18.1 (11)
Forb Cover	9.8 (7.1)	5.5 (4.4)	6.8 (5.3)
Sagebrush Height	18.3 (5.1)	19.8 (8.3)	28.4 (8.6)

In the above table, sagebrush height is in inches. The ZX allotment data was collected during Sage-grouse Habitat Assessments. Sample size (n) = 125. The Ram Lake and Hampton allotment data was collected during Ecological Site Inventories (ESI). The ESI vegetation attributes were not collected consistently; therefore sample sizes are included: Ram Lake allotment sagebrush and grass cover (n=44), forb cover (n=30), sagebrush height (n=39). Hampton allotment sagebrush and grass cover (n=110), forb cover (n=42), sagebrush height (n=44).

Past management actions and natural disturbance

As mentioned above, post-settlement juniper expansion is a threat to shrub-steppe habitats in the project area. In the ZX allotment, juniper encroachment into shrub-steppe primarily occurs in the Fredrick Butte and Dominick pastures, occupying approximately 7,250 acres (39 percent) and 12,650 acres (65 percent), respectively. Miller et al. (2005) describes juniper encroachment into shrub-steppe habitats through phases I, II, and III. Phase I is defined as shrubs, forbs and grasses being the dominant vegetation and juniper canopy cover is less than 10 percent, whereas during phase II, juniper canopy cover is between 10 and 30 percent and is co-dominant with the other vegetation layers. During phase III, juniper cover is greater than 30 percent and the understory is almost eliminated. The majority of juniper encroachment in these pastures is in phase I and II woodland development. In the Ram Lake allotment, all shrub-steppe habitats (7,403 acres) have transitioned to either phase I or II woodlands. Juniper encroachment in the Hampton allotment is contained to the Benjamin and Studhorse pastures, where phase I and II woodlands occupy approximately 11,200 acres between the two pastures.

The biological integrity of old-growth juniper woodlands is also threatened when post-settlement trees “infill” or establish and increase on the site. About 12,050 acres of juniper woodlands in the ZX allotment exhibit infilling by post-settlement juniper. All of the area covered by old-growth juniper

woodlands in the Ram Lake (5,260 acres) and Hampton (10,650 acres) allotments display some level of increased tree densities.

Several restoration treatments have been implemented to reduce post-settlement juniper in these habitats. Over 12,000 acres of post-settlement juniper have been cut in the ZX allotment. Jackpot burns have been applied to approximately 3,400 of the cut acres (in a jackpot burn, limbs from cut trees are piled and burned). Furthermore, broadcast burns have been used in all three allotments (ZX – 1,780 acres; Ram Lake – 4,960 acres; Hampton – 9,950 acres) to reduce post-settlement trees and reintroduce fire in shrub-steppe habitats (in broadcast burns, cut limbs are not piled before burning).

There are several past management actions that have negative impacts to wildlife habitat. Large areas of shrub removal and crested wheatgrass (*Agropyron cristatum*) seeding for livestock and wildlife purposes have occurred in the project area. Approximately 13,900 acres were converted to crested wheatgrass monocultures in the Ram Lake and Hampton allotments. This action was conducted during the 1960s to mid-1980s, prior to current sagebrush management guidelines and is no longer used on the Prineville District BLM.

Two frequently traveled roads and two power lines run through the ZX allotment. The wildlife habitat affected by this infrastructure varies with the species and is discussed in the issues analysis. No major infrastructure affects wildlife habitat in the Ram Lake and Hampton allotments.

Wildlife issues

In the wildlife section there are nine issues that are analyzed in detail and another three issues that are discussed but not analyzed in detail. The first few issues pertain to sage-grouse, and then mule deer, elk, and pronghorn are discussed, followed by bats, waterfowl, and pygmy rabbits. If there is more than one issue for a wildlife species, the first issue will focus on the effects from filling playa dugouts. As displayed below in the issues analysis, there are both positive and negative effects to wildlife that range from enhancing foraging areas for numerous wildlife species to potential habitat loss for waterfowl from this action. Another issue that is analyzed in detail is the effects of new fences on wildlife habitat, particularly sage-grouse and native ungulates (mule deer, elk, and pronghorn). Finally, temporary noise disturbance related to project activities such as well drilling and chainsaw cutting will be discussed. While motor vehicle use can have negative effects on wildlife and this EA has alternatives with actions proposed to remove/relocate roads out of playas, this concern is not analyzed in detail. As analyzed for elk, pronghorn, and deer, the influence of motorized use on existing travel routes is low due to low route density and use rates. Due to the low amount of roads/routes proposed to be closed and because these routes are often short segments scattered across the project area they are not proposed at a large enough scale to show a measurable effect. The proposal to remove/relocate travel routes out of playas is an integral and complementary component of restoring the vegetation conditions by reducing soil compaction, crushing of plants and spread of non-native plants. Additionally, the effectiveness of fenced exclosures would be higher and costs lower (purchase, installation and maintenance of cattle guards) if roads did not enter them.

Focal species

The focal species concept is applied to many conservation efforts that promote wildlife diversity, including landscape restoration. This concept is useful in effects analysis during the NEPA process. There are several specific types of focal species (e.g. flagship, indicator, keystone) that are used to meet complex objectives in conservation planning (Chase and Geupel 2005). Here we use focal species synonymously with the umbrella species definition which states, "A species with large area requirements for which protection of the species offers protection to other species that share the same habitat" (Noss 1990). In order for this concept to be effective, the focal species must have similar habitat requirements and responses to land management actions as all other species across the landscape where conservation is focused (Lambeck 1997).

We have designated sage-grouse as a focal species and analyzed for the other wildlife species with a common issue. Sage-grouse is a landscape species that shares several habitat attributes with many species that are closely associated with shrub-steppe habitats (Rowland et al. 2006, Hanser and Knick 2011). Partners in Flight[4] identifies sage-grouse as a focal species for the conservation of large, high-quality sagebrush habitat with a diverse understory of native grasses and forbs which is also a requirement of several other species (Altman and Holmes 2000). There are several issues in this analysis pertaining to sage-grouse that will involve a suite of species under the focal species concept. These species will be identified during each issue.

How would filling dugouts, removing livestock grazing, and reducing silver sagebrush affect sage-grouse brood rearing habitat on playas?

Affected environment

Limited brood-rearing habitat is believed to be a major factor contributing to declines of sage-grouse populations across their range (Aldridge and Boyce 2007, Atamian et al. 2010). Modeling indicates brood-rearing habitats have decreased since European settlement and are vulnerable to climate change (Evers 2010). Quality brood-rearing habitat is particularly important for chick survival and recruitment (Aldridge and Brigham 2001, Gregg and Crawford 2009), which has been linked to population fitness (Holloran 2005). Given the significance of these habitats to sage-grouse, brood-rearing sites have been identified as critical restoration and conservation areas (Connelly et al. 2004, Hagen 2011a).

Brood-rearing use and habitat selection is well documented in the literature (Connelly et al. 2011a). Two distinct brood-rearing habitats (early and late) are differentiated temporally, spatially, and by their habitat characteristics. Sage-grouse attend early broods for two to three weeks following nesting. For local populations this generally occurs mid- to late June. Early brood-rearing locations are usually established near (< 0.9 mile) nest sites (Connelly et al. 2011a), although the actual size of the area is associated with habitat conditions and can be quite variable (213 – 1,804 acres) (Wallestad 1971, Aldridge and Boyce 2007, Atamian et al. 2010). "On average, 80% of nests are within 6.2 km (4 mi) of the

[4] PIF was founded in 1990 to respond to growing concerns about declines in populations of many bird species. It is a partnership of federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals.

lek; however, some females may nest more than 20 km (12 mi) from the lek on which they were captured" (Hagen 2011a). A study completed on the Prineville District (Hanf 1994) found all "tagged" hens nested within 12.8 kilometers (eight miles); 50 percent of hens nested within eight kilometers (five miles); and 25 percent of hens nested within 3.2 kilometers (two miles) of the nearest lek. There are six active lek complexes in the project area and another six complexes within three miles, which would imply there is nesting and consequently early brood-rearing potential. Early brood-rearing sites are characterized as having less sagebrush cover (less than 18 percent canopy cover), taller grasses (approximately eight inches), and greater grass (11 percent canopy cover) and forb (10.6 percent canopy cover) cover than random locations (Hagen et al. 2007). Sage-grouse increase brood survival by selecting areas rich in forbs and insects over less productive sites (Drut et al. 1994, Gregg and Crawford 2009).

Migration to late brood-rearing areas typically occurs in late June or early July, corresponding with the drying out of upland vegetation at early brood-rearing sites. Population movements between leks and summer areas on the Prineville District average eight miles (Freese et al. 2009) and are highly variable (Hanf et al. 1994), which may indicate a lack of quality brood-rearing habitat (Aldridge and Boyce 2007, Atamian et al. 2010). Late brood-rearing areas are more moist than other sage-grouse seasonal habitats and may include meadows, riparian areas and playas (Drut et al. 1994, Aldridge and Boyce 2007, Atamian et al. 2010, Connelly et al. 2011a). Birds may also follow temperature and precipitation gradients by moving up in elevation to forage on succulent vegetation (Freese et al. 2009, Atamian et al. 2010).

Within the project area, playas occur near sage-grouse leks and other seasonal habitats. These seasonal wetlands are important brood-rearing (early and late) habitat because of their potential forb and insect abundance. They also provide a valuable food source after upland plants have dried out. Playas have the potential to be essential to local populations due to the lack of quality brood-rearing habitat in the area. Ephemeral drainages (creek beds that are only wet for a short period after rain or snow) are infrequent and do not support riparian vegetation, and higher elevation areas typically exhibit juniper cover that limits sage-grouse occurrence (Freese 2009).

Many of the playas in the project area are limited in plant species diversity and/or have altered natural hydraulic and nutrient cycling processes influenced by human activities (e.g., concentrated livestock use, roads, and fences) and the expansion of young juniper. Playas considered in this EA often have dugouts that were excavated during the 1950s – 1970s to create and extend water sources for livestock in areas where water was limited; wildlife also uses this extended water source. As a result, livestock and wildlife concentrate at playas with stock ponds, resulting in increased grazing of plants, trampling of plants, altered nutrient cycles, and soil compaction; contributing to the diminished ecological condition of the playas. Furthermore, stock ponds have altered hydrologic processes because they were created in low areas of playas. Consequently, water drains into them, contributing less water to herbaceous vegetation. Vehicle use through playas can compact soils and discourage wildlife occurrence. Fences that are located in playas increase the potential for wildlife collisions, and are particularly detrimental near sage-grouse leks (Stevens 2011). The Oregon Conservation Strategy (Hagen 2011a) recommends marking fences near special habitat use areas with anti-strike markers as a method to reduce sage-grouse collisions.

Ecological site descriptions show the successional pathways and physical characteristics of plant communities in the natural range of variability (Stringham et al. 2003). Playas in the project area contain two ecological sites or plant communities (ponded clay and lakebed ecological sites), that display different vegetative composition and structure. The ponded clay ecological site, which is known locally as a silver sagebrush playa, contains a plant community that is more similar to upland vegetation than the lakebed ecological site. The potential natural vegetation community for the sliver sagebrush playa is 70 percent grasses, 20 percent shrubs, and 10 percent forbs. The plant association silver sagebrush (*Artemisia cana*) / Nevada bluegrass (*Poa nevadensis*) – beardless wildrye (*Leymus triticoides*) establishes due to poorly drained clay soils which increase the water available for vegetation. Silver sagebrush playas are inundated more than adjacent upland plant communities, but less frequently than lakebed playas. Silver sagebrush playas are not inundated every year and when flooding occurs the duration and depth is less than lakebed playas. As a result of greater water availability, lakebed playas exhibit more ponding tolerant and wetland vegetation. The expected dominant species for this community are spikerush (*Eleocharis* sp.), Baltic rush (*Juncus arcticus* spp. *littoralis*, and dock (*Rumex* sp.). The potential natural vegetation community for the lakebed ecological site is 65 percent grasses and grasslike species (e.g. sedges, rushes) and 35 percent forbs.

Ecological conditions of plant communities can be evaluated with Ecological Site Inventory (ESI), which uses a similarity index that compares present plant communities to historic climax plant communities (Habich 2001). Ecological Site Inventory is complete on 57 playas in the project area. Results of ESI show the majority of silver sagebrush playas in the project area are in 'fair' condition and lakebed playas are in 'good' condition (Table 8). Caution should be taken when interpreting these results, because both playa communities are well below their average expected production and are either missing key plant species or there is a discrepancy in functional group dominance according to the ecological site description. For instance, the average composition by weight of shrubs (68.3 percent), grasses (27.2 percent), and forbs (1.3 percent) on silver sagebrush playas in 'fair' condition on the Prineville District is a severe departure from the historical climax community. Similarly, lakebed playas in 'good' condition on the Prineville District are lacking forb production (2.9 percent) when compared to the expected forb contribution (35 percent). Furthermore, nutrient cycles and energy flow have been altered due to improper livestock grazing of the herbaceous layer, which has facilitated an undesirable soil condition termed "vesicular crust formation." This crust layer has the potential to inhibit seedling establishment of playa grasses and forbs. Tables 6 and 7 below, depict the current conditions and functional group contributions of silver sagebrush and lakebed playas.

Table 8. Ecological sites and conditions of playas in project area (n= total number).

	Silver Sagebrush (n=50)		Lakebed (n=7)		Combined (n=57)	
Condition	Acres	Percent	Acres	Percent	Acres	Percent
Excellent	0	0	0	0	0	0
Good	249	12	546	94	795	31
Fair	1382	69	0	0	1382	53
Poor	390	19	34	6	424	16
Total	2021	100	580	100	2601	100

Table 9. Existing functional group status of silver sagebrush playas throughout the Prineville District.

Functional Group (percent)	Potential Native Plant Community (From Reference Ecological Site)	Existing Native Plant Community (Good Condition) n=13	Existing Native Plant Community (Fair Condition) n=48	Existing Native Plant Community (Poor Condition) n=7
Grasses	70	28	27	8
Shrubs	20	57	68.5	91
Forbs	10	1	1.5	1
Trees	0	14	3	0

Table 10. Existing functional group status of lakebed playas throughout the Prineville District.

Functional Group	Potential Native Plant Community (From Reference Ecological Site)	Existing Native Plant Community (Good Condition) n=10	Existing Native Plant Community (Fair Condition) n=0	Existing Native Plant Community (Poor Condition) n=2
Grasses	65	97	0	9
Shrubs	0	0	0	0
Forbs	35	3	0	91

In addition to improving sage-grouse brood-rearing habitat, this analysis assumes many other wildlife species would benefit from restoring playas; in particular, shorebirds, pronghorn, and birds associated with shrub-steppe and old-growth juniper woodlands. Shorebird habitat would improve as a result of filling dugouts because water would spread across the playas, thus increasing foraging habitat. Other species that visit playas such as pronghorn and migratory songbirds would benefit from improved forage quality.

There are three actions (filling dugouts, removing livestock grazing, and reducing silver sagebrush) in this EA that would improve the ecological conditions of playas and thus benefit brood-rearing habitat. All three actions have different methods of restoration (e.g. active and passive) and degrees to which a playa plant community may improve. For instance, playa plant communities are expected to improve the most from filling dugouts because hydrological processes would be restored and livestock use of plants would be reduced. This analysis assumes playas that have their dugouts filled would transition to at least a 'good' ecological condition. The second action, removing livestock grazing, would remove one of the major factors influencing the current degraded conditions on playas, however playas with dugouts would maintain altered hydrologic processes if dugouts are not filled back in with soil. Only playas that would be permanently excluded from livestock grazing were included in this analysis. These playas are expected to improve by one ecological condition (e.g. poor to fair, fair to good, good to excellent) from this action. Reducing silver sagebrush is probably the least effective method for improving sage-grouse brood rearing habitat in playas, when applied separately from the other two

methods, because it does not address the primary factors (dugouts and concentrated livestock grazing) negatively impacting playa conditions.

First we describe the effects of each individual action apart from the other two ; then we describe the effects of the actions combined.

Effects of filling dugouts

Filling dugouts would help restore playas directly by restoring natural hydrologic processes, and indirectly by reducing the level of livestock use on plants. Dugouts have reduced the water that is available for playa vegetation. As a result, the plant community and the biologic integrity on many playas exhibit a severe departure from the reference native plant community. Filling dugouts would spread water across a larger surface area (see hydrology issues) (Reuter et al. 2013) expanding the area occupied by wetland plant species and improve forage quality and abundance for many species such as sage-grouse, pronghorn, and elk.

Similar to playa vegetation, invertebrate communities are expected to improve as a result of filling dugouts. In Oregon, small invertebrates have been documented on playas as early as late February (Clausnitzer and Huddleston 2002). Filling dugouts would increase the area that invertebrates are able to colonize, thus improving food sources during seasonally important periods for sage-grouse and migratory shorebirds and songbirds.

Filling dugouts would not only restore hydraulic function, but would also reduce disturbances associated with livestock concentrations. Heavy, repeated spring and summer grazing, trampling of vegetation, soil compaction, and altered nutrient cycles are chronic disturbances associated with livestock at playas that contain dugouts. The relationship between livestock behavior and water sources (Valentine 1947) and the negative impacts to vegetation near water holes is well documented (Brooks et al. 2006, Washington-Allen et al. 2004). Livestock concentrate at dugouts, denuding the herbaceous layer. This allows vesicular crust formation, thus inhibiting herbaceous seeding establishment and increases in silver sagebrush. By filling dugouts and providing an alternative water source which would attract livestock, the negative effects of livestock would be reduced.

<u>Alternative 1:</u> The BLM would not fill any dugouts under this alternative, and therefore playas would remain in their current conditions (see Table 11). Playa conditions may slightly improve during wet years and degrade during dry years, but the long-term trend of playa conditions is expected to remain at equilibrium under the current management. Of the playas that have been inventoried, 795 acres would remain in 'good' ecological condition, 1,382 acres in 'fair' condition, and 424 acres would remain in 'poor' condition.

<u>Alternative 2, 3, and 4:</u> The BLM would fill 35 dugouts which would improve 628 acres of playa habitat. Forty-one acres would transition from 'good to excellent,' 450 acres from 'fair to good,' 49 acres from 'poor to good' (Table 11). Another 88 acres would improve; however, the ecological condition of those acres is unknown at this time, so what they would improve to is also unknown. In Alternative 4, the BLM would fill one less dugout than in Alternatives 2 and 3, which would reduce the area improved by about eight acres.

Alternative 5: In this alternative, the BLM would fill the greatest number of dugouts (41), improving 1,613 acres. Playa conditions would transition from 'good to excellent' on 468 acres, from 'fair to good' on 633 acres, and 'poor to good' on 424 acres.

Table 11. Effects of filling dugouts on playa condition.

Condition	Alt 1	Alt 2,3,4	Alt 5
Excellent	0	41	468
Good	795	1,253	1,384
Fair	1,382	932	749
Poor	424	375	0
Total	2,601	2,601	2,601

Effects of removing livestock grazing

Livestock concentrations at dugouts negatively affect the ecological condition of playa habitats and were discussed above under the effects of filling dugouts. In several alternatives, the BLM would eliminate livestock grazing of playa plant communities by either excluding livestock from the entire project area or from areas more closely located around playas that are important for wildlife.

Additionally, some alternatives would remove livestock permanently while others would temporarily using fenced exclosures. Permanent exclosures would provide for the greatest opportunities to increase plant abundance, distribution and species diversity, thus improved ecological condition, especially long term. Often creating fenced exclosures would also include relocating roads/travel routes outside of playas which would decrease soil compaction, crushing of plants and spread of non-native plants. The temporary exclosures would allow the playa areas to improve similarly as the permanent exclosures, especially in the short term. However, when the fences are removed the areas would be grazed periodically by livestock. Because these playas are riparian areas and would provide desirable succulent plants, livestock will be attracted to these areas. However, by locating livestock water sources and other attractants (e.g., salt, mineral blocks) away from playas, livestock concentrations should decrease and allow desirable plant communities to be maintained. While we don't expect areas with temporary exclosures to improve and maintain as good of ecological conditions as they would with permanent exclosures, they should continue to provide better vegetative conditions than currently and under Alternative 1.

Alternative 1: Current livestock grazing would not change; therefore, playa conditions are expected to remain the same. Of the playas that have been inventoried, 795 acres would remain in 'good' ecological condition, 1,382 acres in 'fair' condition, and 424 acres would remain in 'poor' condition.

Alternative 2: Grazing would be removed from the entire project area, including 4,762 acres of playa habitats. Playas that currently experience high livestock use would improve more than playas that receive low use. Typically, playas with dugouts that hold water would benefit more than playas without dugouts. Forty playas (with dugouts) totaling 2,246 acres would improve under this alternative. A total of 656 acres in 'good' condition would improve to 'excellent', 975 acres of 'fair' to 'good', and 424 acres

of 'poor' to 'fair' condition playas (Table 12). The remaining 191 acres of playas with dugouts would improve however the conditions of these playas are unknown. An additional 2,515 acres of playas without dugouts would show slight improvement from their current condition, however, the transition is not expected to be measurable.

Alternative 3 and 4: A total of 1,674 acres of playa habitat would improve with construction of six permanent exclosures in Alternative 3 and seven exclosures in Alternative 4. There would be a transition of 630 acres of 'good' to excellent condition, 635 acres from 'fair' to 'good', and 409 acres from 'poor' to 'fair.' Temporary exclosures would benefit 25 playas including 573 acres similarly as described for Alternative 5 below.

Alternative 5: A total of 2,183 acres would be rested from grazing temporarily allowing plant abundance, distribution and diversity to increase. This temporary rest would also aid in changing livestock use patterns and decrease livestock concentration in playas when the areas are opened back up. Decreased concentrations should help limit pressure on playa vegetation and help maintain plant densities and distributions. By allowing the vegetation to recover, removing attractants, changing livestock behavior and periodically resting playas from grazing this would likely improve the ecological condition, especially in the short term, but also aid these areas in maintaining a fair to good ecological condition long term.

Table 12. Effects of removing grazing on playa condition.

Condition	Alt 1 & 5	Alt 2	Alt 3 & 4
Excellent	0	656	630
Good	795	1,114	800
Fair	1,382	831	1,156
Poor	424	0	15
Total	2,601	2,601	2,601

Effects of reducing silver sagebrush

Decreasing silver sagebrush reduces competition so grasses and forbs can establish and grow, allowing recovery of the herbaceous layer. Playas may improve one ecological temporarily condition (e.g. poor to fair, fair to good, good to excellent), and then transition back to the current conditions as a result of altered hydrologic processes and high livestock use. Thus, sagebrush reduction treatments would only be effective over time if filling dugouts or removing livestock are implemented as well.

Alternative 1 and 5: Silver sagebrush would not be reduced on any playa. Of the playas that have been inventoried, 795 acres would remain in 'good' ecological condition, 1,382 acres in 'fair' condition, and 424 acres would remain in 'poor' condition. See Table 13.

Alternative 2, 3, and 4: Twelve playas totaling 890 acres would receive silver sagebrush reduction treatments. Approximately 105 acres would transition from 'good' to 'excellent,' 1,421 acres would be in 'good' condition, 666 acres in 'fair' condition, and 409 in 'poor' condition. In Alternatives 3 and 4,

these conditions would likely be temporary because hydrologic function would remain altered and heavy livestock grazing would still exist.

Table 13. Effects of reducing silver sagebrush on playa condition.

Condition	Alt 1 & 5	Alt 2, 3 and 4
Excellent	0	105
Good	795	1,421
Fair	1,382	666
Poor	424	409
Total	2,601	2,601

Combined effects of filling dugouts, removing livestock grazing, and reducing silver sagebrush

As mentioned above, if the proposed actions are applied individually, improvement of the ecological condition is contingent on the method that is applied. Playas would show the most improvement from filling dugouts, followed by removing cattle grazing, and reducing silver sagebrush. Because there are several mechanisms (e.g., concentrated livestock use, dugouts, silver sagebrush competition) influencing the current playa conditions, Alternatives 2 – 4 proposes to combine the three actions to resolve these issues. Alternative 5 proposes to fill a greater number of dugouts than Alternatives 2 – 4, so more playa area would improve under this action. However, playas would continue to receive livestock grazing, but it would not be concentrated because the water source would be removed from the playa. Lakebed playas would be expected to receive higher livestock use compared to the silver sagebrush playas, because lakebed playas produce more forage. Also, in Alternative 5 silver sagebrush would not be reduced. This would inhibit the full restoration potential on these playas because the herbaceous layer would unlikely outcompete silver sagebrush without this active restoration method.

<u>Alternative 1 (Combined):</u> No changes would be made in playas, so ecological condition would remain at about what it is currently, with slight improvement or degradation depending on annual precipitation.

<u>Alternative 2 (Combined):</u> Under this alternative, the BLM would restore a larger area of playa wetlands, thus enhancing sage-grouse habitat more than the other alternatives. Approximately 628 acres of playa habitat would improve from filling 35 dugouts. In addition, livestock grazing would be eliminated on 40 playas with dugouts (2,246 acres) and another 2,515 acres of playas without dugouts. Twelve playas totaling 890 acres would receive sagebrush reduction treatments and no new fences would be added across the landscape.

<u>Alternative 3 and 4 (Combined):</u> Alternative 3 and 4 have similar improvements. Alternative 3 would fill 35 dugouts and restore 628 acres, likewise Alternative 4 would fill 34 dugouts, restoring eight less acres than alternative 3. Both alternatives eliminate livestock grazing from 1,674 acres of playa habitat and reduce silver sagebrush on 890 acres.

<u>Alternative 5 (Combined):</u> The BLM would fill the most dugouts (41) under this alternative, restoring 1,613 acres. However, grazing would not be permanently eliminated on playas, nor would silver sagebrush be reduced.

Cumulative effects

In order to define the spatial scope of cumulative effects, we placed a twelve mile buffer around the project area (using GIS ArcMap). The buffer is represents the average distance the local sage-grouse population travels between seasonal habitats (Hanf et al. 1994). This buffered area totals 727,885 acres of public land including parts of three BLM Districts (Prineville 423,848 acres, Lakeview 274,068 acres, and Burns 29,969 acres) and contains 342,525 acres of PPH and 572,727 acres of PGH on both public and private land.

Since 2008, 13,650 acres have had young junipers cut from playa and shrub-steppe habitats and thinned reducing juniper densities in old grow juniper woodlands. This was done to maintain shrub-steppe habitats, improving connectivity between playas and reduce juniper competition for resources in and immediately adjacent to playas. Additionally, two stock ponds were back filled on two playas. Both playas were <5 acres and probably did not hold much water, if any. Each filled playa was fenced to exclude livestock from half of the surface area. Permanent transects were installed in 2010 to observe the influence grazing has on vegetation after filling stock ponds. Furthermore, the Three Wells pipeline was extended 3.5 miles (18,500 ft.) to provide water to three 1,200 gallon water troughs that were installed 0.5 miles from existing stock ponds. The objective is to reduce livestock activity around playas, by providing clean and reliable water away from playas. Vegetation monitoring transects and plots were established to measure the effects of this project.

Ecological Site Inventories (ESI) have been conducted on both lakebed and silver sagebrush playas within the 12 mile buffer area. On the Prineville District, 28 acres (3 percent) are in good condition, 911 acres (94 percent) are in fair condition and 26 acres (3 percent) are in poor condition. Of the 4,005 acres of playas that have been surveyed on the Lakeview District, 1,028 acres (26 percent) are in good condition, 1,742 acres (43 percent) in fair condition, and 1,235 acres (31 percent) in poor condition. The majority of the playas that rated in good condition were lakebed playas. These playas exhibited vegetation production well below the potential natural vegetation community. Four playas (206 acres) on the Burns District are in poor condition. There are no foreseeable plans to restore playas on the Lakeview District.

Within the 12 mile buffer there are 7,777 acres of playa habitat. Zero percent is in excellent condition, 24 percent is in good condition, 52 percent is fair and 24 percent is in poor condition.

Effects of filling dugouts

<u>Alternative 1:</u> No changes would occur to playa management, therefore conditions may slightly improve during wet years and degrade during dry years, but the long-term trend of playa conditions is expected to remain as is. There would not be any playas in excellent condition. The amount of acres in good condition would remain at 1,851 acres (24 percent), 4,035 acres (52 percent) would be fair, and 1,891 acres (24 percent) would remain in poor condition.

<u>Alternative 2, 3, and 4:</u> All three alternatives would have a similar effect on playa condition. Forty-one acres (one percent) would improve to excellent, playas in good condition would increase by six percent from the current conditions, fair condition playas would decrease by six percent and poor condition playas would change slightly 0.06 percent.

Alternative 5: Alternative 5 would increase excellent and good conditions to six and 31 percent, respectively, reduce fair and poor conditions to 44 and 19 percent, respectively.

Effects of removing livestock grazing

Alternative 1 and 5: Similar effects would occur in these two alternatives. Livestock grazing would not be permanently removed. Twenty-four percent of the playa acres would remain in good condition, 52 percent in fair, and 24 percent in poor condition.

Alternative 2: Excellent conditions would increase to eight percent, 28 percent of the playa would be in good condition, 45 percent in fair condition, and 19 percent would be poor.

Alternative 3 and 4: Excellent conditions would increase to eight percent, 24 percent of the playa would be in good condition, 49 percent in fair condition, and 19 percent would be poor.

Effects of reducing silver sagebrush

Alternative 1 and 5: There would be no playas in excellent condition, 24 percent would be in good condition, 52 percent in fair, and 24 percent in poor condition.

Alternative 2, 3 and 4: One percent of the playas would be in excellent condition, 41 percent in good condition, 42 percent in fair, and 16 percent in poor condition.

How would livestock concentrations at water troughs affect sage-grouse nesting habitat suitability?

Affected environment

Suitable nesting habitat is a critical component to maintaining viable sage-grouse populations (Crawford et al. 2004). Nests are established in a variety of shrub-steppe plant communities, but are more common under sagebrush species (Hanf et al. 1994, Connelly et al. 2011a, Hagen 2011a). In Oregon, nests have been documented in both tall (mountain and Wyoming sagebrush) and low sagebrush communities (Hagen 20011a) and are typically (>80 percent) located within three miles of a lek (ODFW 2009). Nest site characteristics are well documented, and indicate sage-grouse nest in areas with greater shrub cover and grass height than random areas (Sveum et al. 1998, Holloran et al. 2005, Hagen et al. 2007). Similarly, the probability of nest success is higher at sites with greater residual grass height and cover than random locations (Hanf et al. 1994, Sveum et al. 1998, Holloran et al. 2005) due to less predation at sites with higher vegetation cover (Gregg et al. 1994, DeLong et al. 1995). Current guidelines for managing nesting habitat suggest maintaining tall sagebrush (15.75 – 31.5 inches tall) between 15 and 25 percent canopy cover, with an herbaceous layer (≥ 7 inches tall) containing greater than 15 percent grass and 10 percent forb canopy cover (Connelly et al. 2000).

Livestock grazing can have positive, neutral, and negative effects on sage-grouse habitat (Beck and Mitchell 2000). The most detrimental impacts to sage-grouse are repeated heavy grazing that reduces residual grass cover, causes nest desertions, or avoidance of an area (Beck and Mitchell 2000). Because livestock are dependent on water, they are attracted to and concentrate around these resources within a grazing pasture (Ganskopp 2001). This concentrated use coupled over time can result in reduced vegetation, soil degradation, increased invasive plant species, and threshold changes in ecological sites

near water sources (Washington-Allen et al. 2004, Brooks et al. 2006, Sasaki et al. 2008), and are more severe during periods of drought (Brooks et al. 2006). Typically, there is an inverse relationship between grazing intensity and distance from a water source (Valentine 1947, Brooks et al. 2006), thus forage production tends to increase farther from water (Adler and Hall 2005). However, there is a distance at which the effects of heavy livestock use are reduced or not measurable. The primary area of influence associated with livestock use is within one mile of a water source (Valentine 1947, Holechek 1988). Therefore, for this analysis we assume all shrub-steppe habitats within one mile of water sources would either be unsuitable or marginal and areas greater than one mile would be suitable.

The site potential of the plant community and human footprint are the two primary factors limiting nesting habitat availability in the project area. In order to describe the effects of livestock concentrations around water sources on nesting habitat suitability several criteria were developed. We defined potential suitable nesting habitat as those ecological sites that contained mountain, Wyoming, or low sagebrush (Hagen 2011a). We considered the entire area of these ecological sites suitable although some portions may currently exhibit post-settlement juniper encroachment and could possibly be defined as marginal. On the other hand, if the ecological site description contained either a juniper component greater than two percent of the total pounds per acre, or was a playa or dry lakebed habitat, or was located on steep slopes, the site was eliminated from this analysis.

We then classified these acres as suitable, marginal or unsuitable depending on distance from roads, powerlines, and livestock water sources. Human activities that introduce or increase infrastructure (e.g. roads, powerlines, well drilling) and noise can reduce nesting habitat suitability (Holloran 2005) and are a significant threat to sage-grouse populations across their range (Johnson et al. 2011, Wisdom et al. 2011). In Oregon, ODFW developed mitigation guidelines to minimize effects associated with roads and powerlines; these are incorporated below (Hagen 2011b).

Two moderate/high traffic roads (Fox and Fredrick Butte) were buffered by < 0.25 mile (unsuitable), 0.25 - 0.5 mile (marginal), and > 0.5 mile (suitable) (Hagen 2011b). The two powerlines in the project area were buffered by < 0.3 mile (unsuitable), 0.3 - 0.6 mile (marginal), and > 0.6 mile (suitable) (Hagen 2011b). Livestock water sources (troughs and dugouts) each had a buffer of < 0.5 mile (unsuitable), 0.5 – 1 mile (marginal), and > 1 mile (suitable). While our analysis assumes all acres within each buffer zone are suitable or not, we recognize there is some variability. For example, the entire area greater than one mile from a water source is probably not exclusively suitable for nesting due to environmental variability or other human activities that were not evaluated in this analysis, and the area less than 0.5 miles from water may contain occasional patches suitable for nesting. These small patches of suitability within unsuitable habitat may be inviting to individual birds but are likely to function as ecological traps and could limit population fitness (Aldridge and Boyce 2007).

In some alternatives, permanent exclosure fences are proposed to protect playa habitats. Areas within these permanent exclosures that meet the nesting habitat criteria above were included in this analysis because of the potential for suitable nesting habitat.

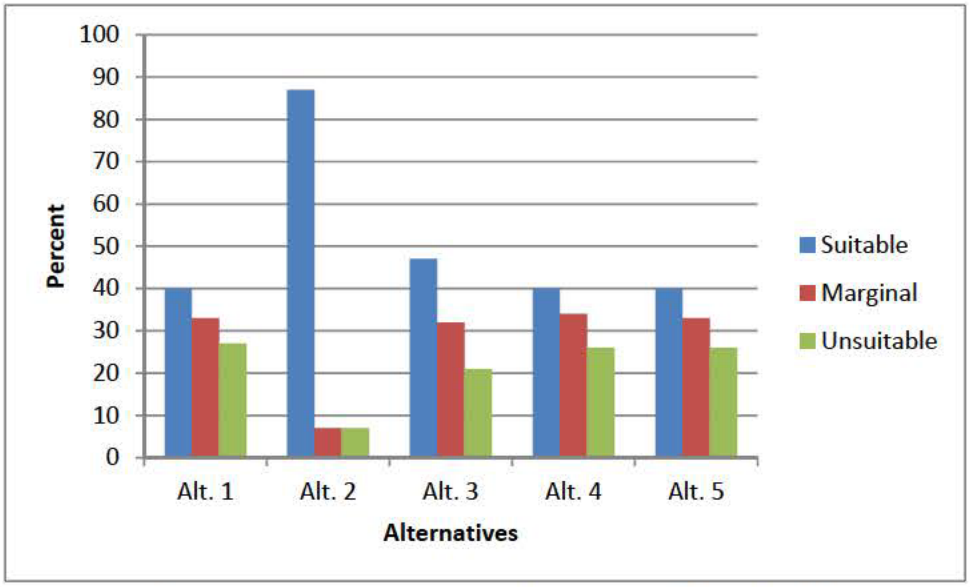
Using the above methodology, there are 94,525 acres of potentially suitable sage-grouse habitat in the project area. Currently, 38,052 acres (40 percent) provide suitable nesting habitat followed by 30,778 acres (33 percent) of marginal habitat, and 25,695 acres (27 percent) of unsuitable.

This analysis assumes sage-grouse is a focal species for other ground nesting species such as vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), horned larks (*Eremophila alpestris*), and common nighthawks (*Chordeiles minor*). All of these species except for common nighthawks, which weren't included in these particular studies, exhibit considerable overlap with sage-grouse habitat characteristics (Rowland et al. 2006, Hanser and Knick 2011). Vesper sparrows, western meadowlarks, and horned larks are common to abundant in the project area during the breeding season, while common nighthawks occur less frequently.

Effects

Alternative 1: Under this alternative, the BLM would not install new water developments or remove existing water developments. Eighty-five water developments would remain in the project area. Suitable nesting habitat would continue to be available on 38,052 acres, followed by 30,778 acres of marginal habitat, and 25,695 acres of unsuitable (Figure 1). This alternative would provide the same percentage of suitable habitat as Alternative 4 and 5, but less than Alternatives 2 and 3.

Figure 1. Nesting habitat suitability.



Alternative 2: The greatest amount of suitable nesting habitat (81,806 acres) would be available in this alternative (Figure 1) because the BLM would remove livestock grazing from the project area. Marginal and unsuitable habitat would contain the same amount of area 6,483 acres.

Alternative 3: This alternative would provide the second greatest amount of suitable nesting habitat with a 6,586 acre (7 percent) increase from the existing condition (Figure 1). The increase in nesting suitability is a result of fewer water developments (67). Both Alternatives 3 and 4 propose livestock exclosures; however, Alternative 3 intends to install larger exclosures than alternative 4. Approximately 3,713 acres of suitable nesting habitat would be available in Alternative 3 compared to 455 acres in Alternative 4 within permanent exclosures.

Alternatives 4 and 5: Alternatives 4 and 5 have a similar amount of water developments proposed (82 and 81) and a similar amount of suitable habitat as Alternative 1 (Figure 1).

One major difference between Alternatives 4 and 5 and Alternative 3 is the location of a proposed water development in the North Four Corners pasture in the ZX allotment. The new water development in Alternative 3 would be located adjacent to the old water source, which is near the southern pasture boundary and on the fringe of suitable sage-grouse habitat. Conversely, Alternatives 4 and 5 would locate the new water development approximately two miles northwest from Alternatives 3's location. This water development would be located between two leks and in the center of sage-grouse suitable habitat. This pasture contains the highest lek density of any pasture in the project area besides KO Butte, and provides the most unfragmented sage-grouse habitat. Alternatives 4 and 5 would locate water developments under powerlines; therefore, the total area of potential nesting suitability is similar between the alternatives. However, the proposed water development locations in Alternative 4 and 5 would increase livestock use farther north in the pasture that historically has not received this disturbance. Increased disturbance would occur every two out of three years when cattle are in the pasture.

Cumulatively: Approximately 130,000 acres outside the project area on the Prineville District is providing suitable nesting habitat according to the average of 336 Sage-grouse Habitat Assessment Framework plots (sagebrush canopy cover (22.7 percent), sagebrush height (19.3 inches), grass canopy cover (20.2 percent), forb canopy cover (9.9 percent), and grass and forb height (8.1inches).

The primary foreseeable threat to sage-grouse nesting habitat outside the project area is habitat loss due to juniper encroachment. Using the 12 mile buffer that was mentioned in the previous issue, rough estimates from ESI indicate 55,830 acres of shrub-steppe habitat outside the project area on the Prineville District are threatened by encroaching juniper, although 153,026 acres remain treeless. Juniper encroachment on the remaining 208,856 acres has not been evaluated, but large portions of this area remain free of juniper (personal observation and aerial photography).

What effect would encroaching juniper have on sage-grouse habitat?

Affected environment

Post-settlement juniper expansion can have negative effects on shrub-steppe habitats (Miller et al. 2000) and potentially displace wildlife species that depend on these habitats until trees have been removed or decreased to a threshold tolerated by a particular species (Noson et al. 2006, Reinkensmeyer et al. 2007, 2008). For instance, sage-grouse are believed to avoid areas that have greater than five percent juniper cover (Freese 2009) although in southern Oregon successful nests have been recorded in slightly greater than 10 percent juniper cover (pers. com. G. Lorton). Likewise in shrub-steppe habitats, songbird population densities decrease as post-settlement juniper trees increase (Noson et al. 2006, Reinkensmeyer et al. 2007, 2008).

In this EA, juniper thinning is only being considered in areas with wilderness characteristics. This analysis is specific to post-settlement juniper expansion into shrub-steppe habitats, which includes sage-grouse habitat and species closely associated with shrub-steppe habitats. To estimate the acres of shrub-steppe habitat impacted by post-settlement juniper expansion several assumptions were developed. For this analysis we use three descriptive terms, suitable, marginal, and unsuitable to describe levels of habitat suitability (modified from the Sage-Grouse Habitat Assessment Framework, Striver et al. 2010). Suitable habitats are areas that do not contain juniper. Marginal habitats are those that have low densities of juniper, usually referred to as Phase I, where shrubs and grasses are still the dominant vegetation life form and juniper cover is less than 10 percent (Miller et al. 2005). Unsuitable habitats are described as Phase II and III woodlands where juniper cover is greater than 10 percent and juniper is the dominant component.

Several sources of information were used to describe the existing habitat suitability conditions for shrub-steppe habitats, including: sage-grouse habitat assessments, ecological site inventories, National Agricultural Imagery Program, proximity to pre-settlement stands (Rowland et al. 2008), and personal observation. For this analysis we considered the entire shrub-steppe habitat within wilderness characteristics area to be marginal habitat.

This analysis assumes 2,000 acres of post-settlement juniper would be cut annually (up to 21,440 acres total) because this is the average amount of acres that have been cut in the area from 2008 to 2013.

We presume that continued juniper encroachment would cause the entire shrub-steppe area (20,904 acres) to transition from suitable to marginal or marginal to unsuitable habitat within 30 years (Johnson and Miller 2006, Miller et al. 2008). Accordingly, slightly less than 696 acres would transition from suitable to marginal or marginal to unsuitable each year.

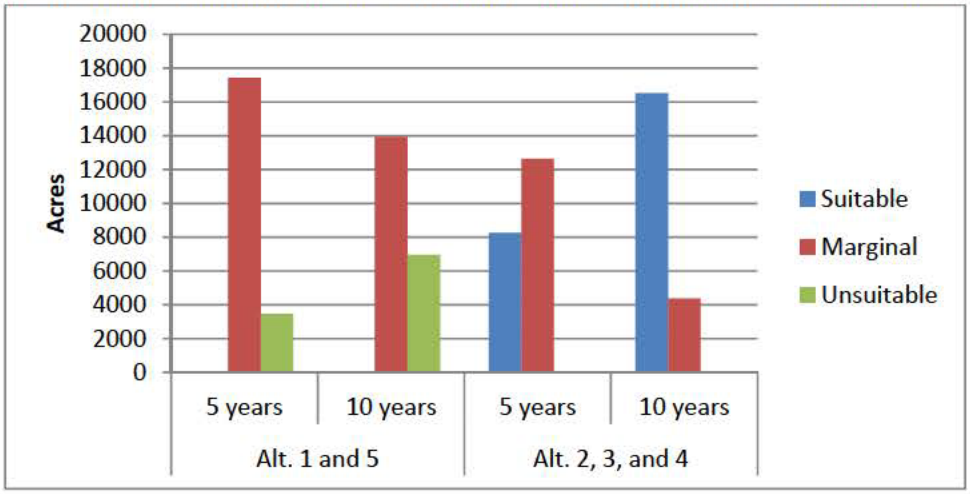
In Alternatives 2, 3, and 4, 696 acres would transition from marginal to unsuitable and 2,000 acres would be cut, leaving 2,000 suitable and 18,904 acres marginal. During the second year, half (348 acres) of the 696 acres would transition from suitable to marginal and half to marginal to unsuitable, maintaining 1,652 acres of suitable, a no net loss or gain of marginal (18,904 acres), and 348 acres of unsuitable before juniper cuts that year. After 2,000 acres are cut that year, 3,652 acres of suitable and 17,252 acres of marginal would remain. Following the first year this model produces an annual gain of 1,652 acres of suitable and a loss of 1,652 acres of marginal habitat from the current conditions (20,904 acres of marginal) and assumes unsuitable habitat would be included in the 2,000 acres that are cut each year.

Effects

Alternatives 1 and 5: No juniper would be cut in shrub-steppe habitats in areas with wilderness characteristics. Approximately 696 acres of marginal habitat would transition to unsuitable habitat each year as juniper continues to expand into shrub-steppe. In five years, 17,424 acres (83 percent) would be marginal habitat and 3,480 acres (17 percent) would be unsuitable habitat for sage-grouse (Figure 2). In 10 years, 13,944 acres (67 percent) would remain marginal and 6,960 acres (33 percent) would be unsuitable habitat. There would be zero acres of suitable habitat available in these alternatives.

Alternatives 2, 3, and 4: Post-settlement juniper trees would be cut in shrub-steppe habitats, providing the opportunity to restore these acres to suitable condition. In five years, 8,260 acres (40 percent) would be restored to suitable habitat, 12,566 acres (60 percent) would be marginal and there would be no unsuitable habitat. In 10 years, 16,520 acres (79 percent) would be suitable, 4,653 (21 Percent) acres would be marginal and there would be no unsuitable habitat.

Figure 2. Habitat suitability from cutting juniper in areas with wilderness characteristics.



Cumulative effects

There are currently 98,177 acres of shrub-steppe habitat in the project area (69 percent of the project area) with the majority occurring in the ZX and Hampton allotments. Over three quarters (77,273 acres) of this shrub-steppe habitat is located outside of areas with wilderness characteristics. In these areas, juniper treatments are covered under the existing Decision Record for the HDSS EA. Over 11,500 acres of young juniper has been cut in the ZX allotment under that Decision Record since 2007.
Using the assumptions, sources, and methods above there are about 8,205 acres of shrub-steppe habitat that is considered marginal due to juniper encroachment. The remaining 69,068 acres of shrub-steppe are considered suitable for this specific analysis.

In the foreseeable future juniper cuts within the project area are expected to be focused primarily in areas with wilderness characteristics. Therefore, the average acres per year of post-settlement juniper cuts outside areas of wilderness characteristics would be reduced from 2,000 acres per year to 500 acres or less. For this cumulative effects analysis we assume 500 acres would be cut each year.

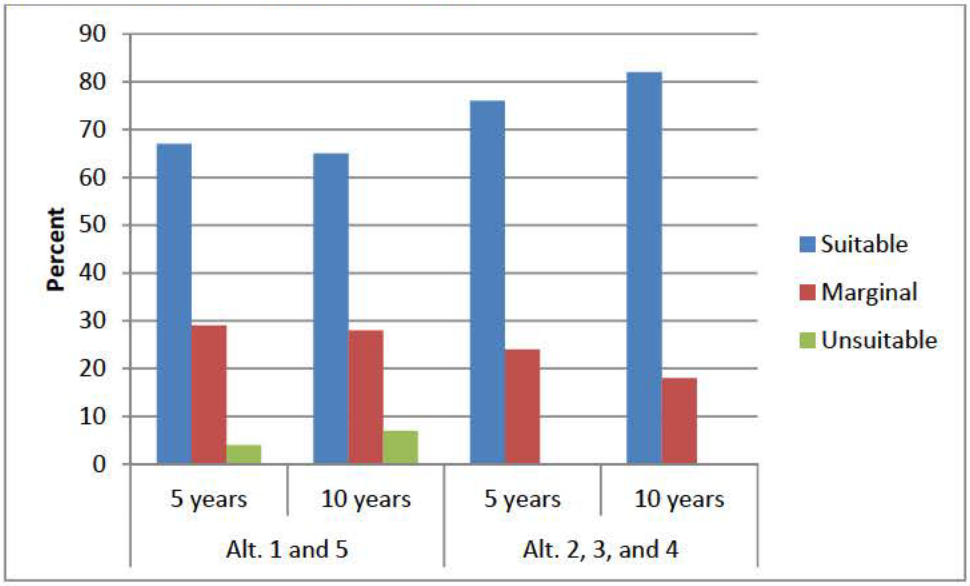
Another difference from the direct effects analysis is the amount and proximity of shrub-steppe habitat to old-growth juniper woodlands between areas with wilderness characteristics and areas without wilderness characteristics. The areas with wilderness characteristics are surrounded by old-growth woodlands and are small in size. Conversely, areas outside of wilderness characteristics contain less old-growth and are large in size. Given those two factors, the areas with wilderness characteristics are expected to transition from suitable to marginal more rapidly than the suitable habitat that does not have wilderness characteristics (Johnson and Miller 2008, Rowland et al. 2008). For this analysis we assume the entire shrub-steppe habitat outside of areas with wilderness characteristics would transition from suitable to marginal in 100 years if post-settlement trees are not cut. However, because of the current seed source and proximity to old-growth woodlands we assume the 8,205 acres that are currently considered marginal would transition to unsuitable in 30 years.

Under these circumstances and assuming unsuitable habitat would be cut each year, approximately 546 acres of suitable habitat would transition to marginal, annually. In five and ten years 66,338 and 63,608 acres of suitable habitat would remain outside of areas with wilderness character, respectively. In five years 10,935 acres and in ten years 13,665 acres would be marginal.

Alternatives 1 and 5: In five years 66,338 acres (67 percent) of shrub-steppe habitat in the entire project area would be suitable sage-grouse habitat, 28,359 acres (29 percent) would be marginal, and 3,480 acres (4 percent) would be unsuitable (Figure 3). In 10 years, 63,608 acres (65 percent) would be suitable sage-grouse habitat, 27,609 acres (28 percent) would be marginal, and 6,960 acres (7 percent) would be unsuitable habitat.

Alternatives 2, 3, and 4: In five years suitable sage-grouse habitat would total 74,598 acres (76 percent), marginal habitat would account for 23,579 acres (24 percent), and there would be no unsuitable habitat. In 10 years suitable sage-grouse habitat would total 80,128 acres (82 percent), marginal habitat would account for 18,049 acres (18 percent), and there would be no unsuitable habitat.

Figure 3. Habitat suitability, cumulatively.



How would fences affect sage-grouse?

Affected environment

Modification of sage-grouse habitats due to fence construction is an increasing threat to sage-grouse throughout its range (Knick et al. 2011, Connelly et al. 2011b). Fences can cause collisions and fatalities in sage-grouse habitat and serve as perches for raptors; however the ramifications of these threats are not well known. Because they are linear features, the actual footprint of fences is difficult to determine (Leu and Hanser 2011). A recent study in Idaho indicates there is a relationship between sage-grouse collisions and fence densities, proximity to leks, topography, and fence material and design (Stevens 2011). Moreover, this research suggest marking fences near leks dramatically (>80 percent) reduces sage-grouse collisions (Stevens 2011, Stevens et al. 2012). The BLM incorporated these results into the Greater Sage-grouse Interim Management Policies and Procedures which recommends marking fences within 1.25 miles of leks, particularly where fence densities exceed 1.6 miles of fence per mi^2 (BLM 2011a).

The Stevens (2011) study was conducted during the breeding season in areas adjacent to leks (1.6 mi.), so inference is limited spatially and temporally to this specific seasonal habitat. Sage-grouse can migrate several miles between seasonal habitats (Hanf et al. 1994, Freese et al. 2009) and form large flocks during winter (Beck 1977), therefore collision risks are not restricted to breeding habitats. For that reason, this analysis includes fences that are greater than 1.25 miles from a lek but within PPH, as well as fences within 1.25 miles of a lek.

A range of temporary and permanent fence options are provided in the alternatives to protect playa habitats. Temporary fences would be located around the perimeter of playas for three to seven years to help vegetation establish after dugouts are filled and to reduce the probability of cattle getting stuck in the filled dugouts. Permanent fences would be constructed around large playas that are believed to be

of higher value for sage-grouse and other wildlife species. The short-term analysis includes both temporary and permanent fence, whereas the long-term analysis includes only permanent fence.

Existing fence densities within 1.25 miles of a lek are low (0.34 miles per mi²) according to BLM interim guidelines which recommend installing sage-grouse collision markers on fences, where fence densities exceed 1.6 miles per mi². Similarly, existing fence densities in areas greater than 1.25 miles of a lek and within PPH are low (0.53 mi²). Additionally, as described below, all of the proposed actions in this EA would result in fence densities that are well below the interim guidelines.

Effects

Alternative 1: In PPH within the project area, there are currently 6.9 miles of fence within 1.25 miles from leks, and 59.6 miles of fence greater than 1.25 miles from leks. If Alternative 1 is selected, these fences would remain in place, and no new fences would be added, therefore fence density would remain at existing levels: within 1.25 miles of leks it would remain at 0.34 miles of fence per mi²; and outside of 1.25 miles of leks it would remain at 0.53 mi².

Alternative 2: Short-term and long-term fence density would be lowest under this alternative (Figure 4). The BLM would remove nearly five miles of fence from sage-grouse habitat within 1.25 miles of leks leaving 2.2 miles. Fence density within 1.25 miles of leks would be 0.11 miles per mi². In areas greater than 1.25 miles of leks, but within PPH the BLM would remove 37 miles of fence which would leave 23 miles (0.11 miles per mi²) (Table 14). Under this alternative sage-grouse collisions and deaths and predation risks are expected to be lower than all other alternatives.

Alternative 3: The BLM would add 5.3 miles of temporary fence within 1.25 mile of a lek, increasing fence density to 0.6 miles per mi². About three miles of permanent fence would be constructed within 1.25 miles of leks, which would amount to 0.5 miles per mi². In areas greater than 1.25 miles of leks, the BLM would build 12 miles of temporary fence totaling 0.63 miles per mi². Approximately 3.5 miles of permanent fence would be built in areas greater than 1.25 miles of leks totaling 0.56 miles per mi². Permanent fence would eliminate livestock disturbance on 160 acres of playa habitat in PPH that is greater than 1.25 miles from leks. Permanent fences would be located on uneven terrain, in juniper woodlands, or near roads to reduce sage-grouse collision probability (Stevens 2011). In addition, fences constructed in the Studhorse and Benjamin pasture would allow the entire Canary Lake pasture (2,292 acres) to be rested from livestock, including 375 acres of playa habitat. The entire pasture is located in PPH. Canary Lake playa is a historical lek, however birds have not been documented in ten years.

Alternative 4: Temporary fences would not be built under this alternative. Permanent fence density would be similar to Alternative 3. Typically, permanent fences would be located at the playa edge on flat terrain. This location would exclude livestock grazing from the playa and reduce the number of AUMs lost compared to Alternative 3. Under this alternative, sage-grouse collision probability would be greater than Alternative 3 because fences would be built on open, flat topography (Stevens 2011). However, sage-grouse collisions with temporary fences would be eliminated in this alternative. A permanent exclosure would eliminate livestock grazing from the Canary Lake playa, however the rest of the pasture would be grazed.

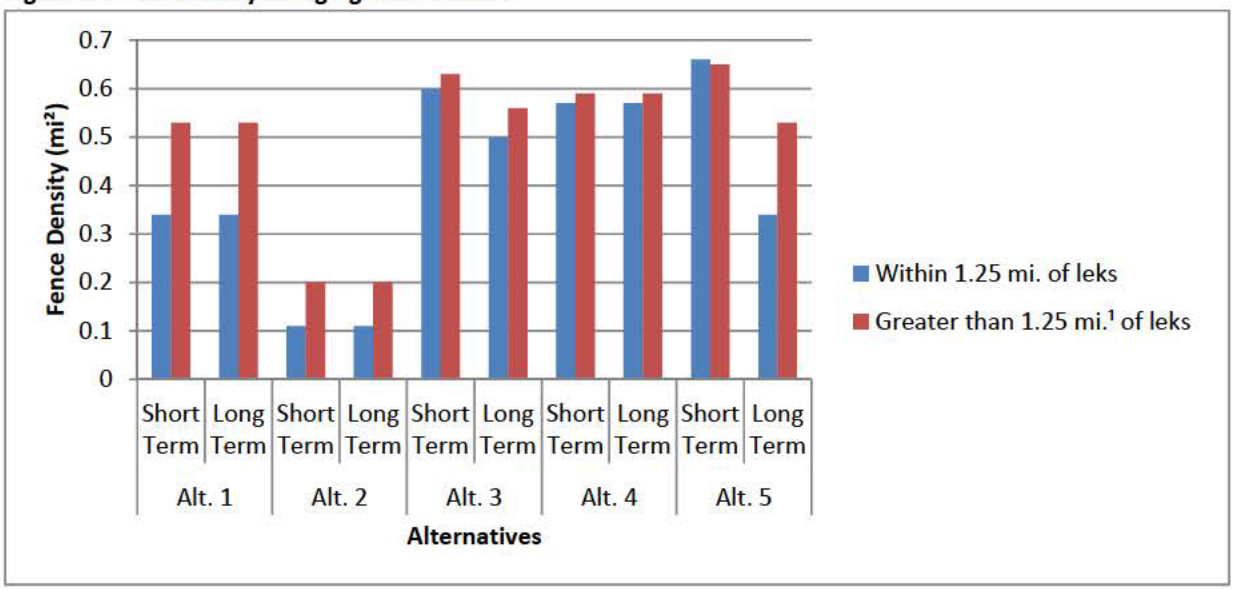
Alternative 5: Temporary fence density would be greatest under this alternative (Table 14), therefore have the greatest negative impact to sage-grouse for three to seven years. Playas that have their dugouts filled would have a temporary fence in place for no more than seven years. No permanent fences would be built, so after seven years, fence density would be identical to the existing conditions (Table 10). No playas would be permanently excluded from livestock grazing. Livestock would be excluded from Canary Lake for no more than seven years; the rest of the pasture would have livestock grazing.

In the table and figure below, fences >1.25 miles from a lek are located in PPH.

Table 14. Amount of fences (miles) in sage-grouse habitat.

	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
Fence Miles	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Within 1.25 mi. of leks	6.9	6.9	2.2	2.2	12.2	10	11.5	11.5	13.3	6.9
Greater than 1.25 mi. of leks	59.6	59.6	23	23	71.3	63.1	67	67	73.6	59.6

Figure 4. Fence density in sage-grouse habitat.



How would noise from well drilling and juniper cutting affect sage-grouse breeding behavior?

Typically, sage-grouse leks (breeding areas) are sparsely or non-vegetative areas that are surrounded by productive sagebrush and herbaceous plant communities. Sage-grouse often show strong loyalty towards leks, potentially attending the same lek for several generations (Connelly et al 2011a). In central Oregon, lek activity typically begins around March 1 and may extend to as late as May 1 (Hanf et al. 1994). There are six active lek complexes (two or more leks in close proximity) in the project area, as well as four more lek complexes outside but within two miles of the project boundary.

The majority of research that examines noise impacts to sage-grouse pertains to noise generated by energy developments near leks (Blickley et al. 2012a, Blickley et al. 20012b, Blickley and Patricelli 2012, Holloran 2005, Patricelli et al. 2012). Noise can negatively affect sage-grouse in several ways: 1) chronic noise can increase stress hormone levels (Blickley et al. 2012b) and cause avoidance of leks (Blickley et al. 2012a); 2) introduced noise can mask communication during breeding (Blickley and Patricelli 2012); and, 3) background noise makes it harder for birds to detect incoming predators, leading to decreased foraging efficiency (Quinn et al. 2006).

Management guidelines in Oregon suggest mitigating for sound levels > 40 decibels (dBA) at the perimeter of leks (Hagen 2011b). These guidelines assume sage-grouse are disturbed at sound levels >10 dBA above ambient noise (Patricelli et al. 2012), and ambient noise levels in shrub-steppe habitats range from 30 to 40 dBA (EPA 1978). However, new evidence suggests sound levels in occupied sage-grouse habitats actually range from 20 to 22 dBA (Patricelli et al. 2012). In light of this new evidence on ambient noise levels, the BLM suggest noise levels should not exceed 30 to 32 dBA at sunrise at the perimeter of a lek during the breeding season (Sage-grouse National Technical Team 2011).

A chainsaw emits about 110 dBA within one meter of the source. As noise travels, it drops by 6 dBA every time the distance is doubled, therefore unshielded chainsaw noise (no vegetation or terrain interference) is expected to be 32 dBA at 5.1 miles from the source. Since all alternatives prohibit chainsaw work within 5.1 miles of an active lek during the breeding season (March 1 – June 30), there would be no effects on lekking birds so the issue is not considered in detail.

Five wells would be drilled in alternatives 3, 4, and 5. To minimize impacts to sage-grouse habitat, all five wells would be in old-growth juniper woodlands, under major powerlines, adjacent to frequently traveled roads, or a combination. Drilling operations (e.g. set up, stabilization, drilling) would occur for three weeks per well, of which two weeks are actual drilling. Since alternatives 3 – 5 require drilling to occur outside the breeding season (March 1 – June 30), there would be no impacts to lekking sage-grouse from well drilling operations.

How would filling dugouts affect availability of free water for sage-grouse?

Across their range, sage-grouse attain water from succulent vegetation rather than from water developments (Connelly et al. 2011a). Female sage-grouse generally avoid water developments (Connelly and Doughty 1989, Hanf et al. 2004), possibly to avoid predation. Yet, in the project area male sage-grouse use water developments during the summer and falls months, especially during drought years (Hanf et al. 2004). Artificial water sources can serve as predator sinks (Connelly and Doughty 1989) and spread West Nile Virus (Walker et al. 2007), thus functioning as ecological traps for local populations (Aldridge and Boyce 2007).

Filling dugouts would eliminate any threats associated with playa dugouts and improve brood-rearing habitat. However, Alternatives 3, 4, and 5 propose to replace free water lost by filling dugouts with new water troughs. The new water troughs would have similar negative effects (predation sinks, West Nile virus) as playa dugouts. An additional threat associated with water troughs is birds could drown. Wildlife escape ramps would be installed in all new troughs to mitigate this issue.

This analysis shows the number of artificial water sources throughout the project area. Artificial water sources include troughs, guzzlers, and dugouts that hold water.

In Alternatives 1, 3, 4, and 5, water troughs would be filled with water when cattle are in the same pasture where the trough is located. After the cattle are removed from the pasture (typically September), the troughs would be filled one time to provide water for wildlife.

Alternative 1: The number and type of artificial water sources would not change. There would continue to be 41 troughs, 40 dugouts, and 12 guzzlers for a total of 93 artificial water developments.

Alternative 2: Artificial water developments would be reduced from the current conditions to 28 water sources (16 dugouts and 12 guzzlers). Sage-grouse would face the fewest threats associated with artificial water developments in this alternative.

Alternative 3: There would be 81 artificial water developments in this alternative: 53 troughs,16 dugouts, and 12 guzzlers.

Alternative 4: The most artificial water developments (96) would occur in this alternative. There would be 67 troughs, 17 dugouts, and 12 guzzlers.

Alternative 5: This alternative would have 67 troughs, 10 dugouts, and 12 guzzlers for a total of 89 water sources.

How would the loss of free water affect mule deer, elk and pronghorn distribution?

Affected environment

Water is a limiting factor for native ungulate distribution in shrub-steppe habitats (Kindschy et al. 1982, Leckenby et al. 1982). Elk and mule deer are strongly associated with water developments in arid environments, especially during the breeding season and dry periods; while the relationship between pronghorn and water developments varies among regions (Krausman et al. 2006, Rosenstock et al. 1999).

Wildlife guzzlers, water troughs, and playas provide water for wildlife in the project area. There are four wildlife guzzlers in the ZX allotment and eight in the Hampton allotment that typically provide water through the summer. There are 41 water troughs that provide water for wildlife whenever cattle are in the same pasture that the trough is located. Water availability on playas is not predictable (varies depending on annual precipitation, topography, et cetera). Playas with dugouts provide water for wildlife longer annually than playas without dugouts. There are at least 40 dugouts in the project area that hold water for an unknown period of time each year.

Water is distributed unevenly across the project area. The Hampton allotment contains the highest water densities, followed by Ram Lake, and ZX (Table 16, under bat issue). The average distance between water sources is lowest in the Ram Lake allotment, then Hampton and ZX (Table 16, under bat issue).

This analysis sometimes uses the term native ungulates in place of mule deer, elk, and pronghorn. Native ungulates requirements for water vary between the species. Pronghorn typically occupy habitats farther from water than mule deer and elk (Krausman et al. 2006). For mule deer, use is highest within 1.9 miles from a water source (Boroski and Mossman 1996, Krausman et al. 2006). In order to analyze the effects of water distribution on native ungulates we defined the acres within a 1.9 mile buffer around available water sources (e.g. troughs, dugouts, and guzzlers) as high use areas for native ungulates. Our assumption is the 1.9 mile criteria for mule deer would include high use area for elk and pronghorn. By using these assumptions and methods there are 129,459 acres (91 percent of the project area) of high use areas currently in the project area.

Effects

Alternative 1: Water distribution would not change from the existing condition, thus 129,459 acres (91 percent) of high use area would be available for native ungulates.

Alternative 2: In this alternative dugouts would be filled, but water sources would not be replaced as they are in Alternatives 3, 4, and 5 because grazing is excluded. This alternative would contain the least amount of high use area, 91,206 acres (64 percent). The amount of habitat within 1.9 miles of a water source would be reduced by 34,409 acres from the current condition. The majority of habitat loss would be in the ZX allotment where water is limited.

Alternatives 3, 4, and 5: Most of the water sources that would be lost from filling dugouts would be replaced with a water trough. Alternative 3 would contain 128,636 acres (90 percent) of high use area, Alternative 4 would expand to 131,731 acres (92 percent), and 130,518 acres (91 percent) would be maintained in Alternative 5.

Although water troughs were included in the analysis, they only have water when cattle are in the same pasture. So, native ungulate high use area in Alternatives 3, 4, and 5 would be fewer than these numbers indicate. Furthermore, dugouts would likely hold water for longer periods each year than troughs. However, in the event dugouts dry out in the future, troughs would be a valuable resource for native ungulates.

What effect would fences have on mule deer, elk and pronghorn habitat?

Affected environment

Fences fragment native ungulate habitat, and potentially limit migratory movement and cause collision or mortalities of individuals (Scott 1992, Harrington and Conover 2006). These threats may be magnified if fences are located in high use areas or are constructed with dimensions that are unsuitable to the behavior of that particular species (Harrington and Conover 2006). The project area is located in both mule deer and elk winter range and year round pronghorn habitat, but no critical habitat was identified in the Brothers/La Pine RMP (1989). Typically, wildlife fences installed on BLM lands are designed to minimize negative effects associated with this development. The majority of the fences in the project area are four - strand barbed-wire, with the top wire no higher than 42 inches above ground to allow mule deer and elk to jump over, and the bottom wire at least 16 inches above ground to allow

pronghorn to go under, and the top two strands 10 – 12 inches apart from each other reduces the probability of mule deer getting caught when they jump over fences.

In contrast to fragmenting habitat, fences would exclude cattle grazing which should increase native ungulate use inside the larger exclosures (Coe et al. 2004). The larger exclosures would provide a refuge for ungulates, thus facilitating energy demands by reducing their home range and increasing resting time due to less competition with cattle (Kie et al. 1991, Loft et al. 1991).

Geographic information system (GIS) (ArcMap 101) was used to determine miles of fence in the project area. Data from GIS includes all known fences on BLM land and does not account for fences on private land. Currently there are 178.4 miles of fence within the project area equating to 0.8 miles per square mile. To our knowledge, there is no scientific literature identifying fence density thresholds for native ungulate populations.

Temporary fences are constructed for less than seven years, whereas permanent fences are in place for more than seven years. In this analysis, temporary fence miles and permanent fence miles are combined into temporary fence miles because temporary and permanent fences could be constructed at the same time. Permanent fence miles only include fences that would be in place for more than seven years.

Effects

Alternative 1: No fence construction or removal would occur under this alternative. Therefore, 178 miles (0.8 mi/mi^2) of fence would be retained in the project area. Competition between cattle and native ungulates would remain throughout the project area when cattle are in the pastures.

Alternative 2: This alternative would remove 77.1 miles of fence and reduce fence densities to 0.45 mi/mi^2 (Table 15). In Table 15, Temp = temporary, less than 7 years, and Perm= permanent, greater than 7 years. The numbers in the temporary column include both temporary and permanent. Under this alternative, temporary and permanent fence density would be lowest of any alternative. Cattle grazing would not occur, so all interior pasture fences and allotment boundaries would be removed. Fences adjacent to private land and allotment fences that are also used by an allotment outside of the project area would remain. Native ungulate habitat in the Ram Lake and Hampton allotments would benefit the most due to existing higher fence densities in these allotments compared to the ZX allotment. Competition with cattle would be eliminated.

Alternative 3: This alternative would have higher temporary fence density than Alternatives 2 and 4, but the same as Alternative 5 (Table 15). Nineteen miles of temporary fence would be constructed around 25 playas that would have their dugouts filled. A total of 573 acres of playa habitat would be rested from livestock grazing for 3 to 7 years while structure and function of plant communities within the playas recovers. Temporary fences would eliminate disturbance from cattle and protect cattle from getting stuck in mud filled dugouts.

Eighteen miles of new permanent fence would be installed across the project area in Alternative 3. A total of 1,610 acres of playa habitat including six large lakebed playas would be fenced, protecting food resources for native ungulates, in particular pronghorn (Good 1977). Fencing would fragment native

ungulate habitat in the project area, however fence density would only increase by 0.07 percent (Table 15). Fences would eliminate competition with cattle on 2,214 acres of upland habitat. Additionally, five miles of fence would be installed in the Benjamin and Studhorse pastures on the Hampton allotment. Each pasture would be dissected through the middle with approximately 2.5 mile of fence. The Hampton allotment is on a five year rotation. Fences would allow for a slight change in the season of use which would increase the number of years pastures are not grazed during the critical growing season in seven out of ten pastures and improve habitat conditions for native ungulates. Additionally, competition with cattle would be eliminated in the entire Canary Lake pasture (2,668 acres) including 375 acres of playa habitat).

Alternative 4: No temporary fence would be installed under this alternative. Twenty miles of new permanent fence would be constructed to provide seven permanent fence exclosures. Under Alternative 4 a similar amount of playa habitat (1,602 acres) would be protected as Alternative 3. In this alternative fences would be installed along the edge of the perimeter of playas to minimize the reduction of AUMs that would be lost under Alternative 3, which proposes larger exclosures. Permanent fences would eliminate competition between cattle and native ungulates on approximately 773 acres of upland habitat. Five miles of pasture fences would be installed in the Benjamin and Studhorse pastures, which would increase the number of years pastures are not grazed during the critical growing season in seven out of ten pastures and improve habitat conditions for native ungulates. An exclosure fence would be installed around the perimeter of Canary Lake playa instead of excluding the entire pasture from livestock grazing as in Alternative 3, resulting in 510 acres (including 375 acres of playa) that competition between cattle and native ungulates would be eliminated.

Alternative 5: Under Alternative 5, thirty-four miles of temporary fence would be constructed around 34 playas for three to seven years. No permanent fence would be constructed, so when temporary fences are removed, fence density would return to the existing condition. This alternative would increase fence density in the short-term similar to Alternative 3. Competition between cattle and native ungulates would be reduced on 2,183 acres. No fence construction in the Benjamin and Studhorse pastures would occur in this alternative. No permanent fence would be built, therefore when temporary fences are removed, fence densities would equal Alternative 1.

Table 15. Amount of fence by alternative.

	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Fence amount (miles)	178	178	101	101	213	194	197	197	211	178
Fence density (mi/mi²)	0.8	0.8	0.45	0.45	0.95	0.87	0.88	0.88	0.95	0.8

What effect would noise from well drilling and juniper cutting have on seasonally important habitat for pronghorn, elk, and mule deer?

Affected environment

The entire project area (143,027 acres) provides year round habitat for pronghorn and winter habitat for elk; whereas, mule deer winter range occupies 112,542 acres.

Native ungulates are particularly vulnerable during the winter months (December 1 – April 15) when harsh climate and poor foraging conditions decrease survival rates (Wallmo et al. 1977, Hobbs 1989). Disturbance during winter could exacerbate the situation by displacing individuals from suitable to less suitable habitat, thus increasing energy demands due to flight response and poorer habitat conditions.

Several studies have documented the effects of ungulate behavior from human disturbances (Rowland et al. 2000, Gaines et al. 2003, Wisdom et al. 2005b, Stankowich 2008). However, the relationship between noise and ungulate behavior is less clear because few studies isolate noise from other confounding variables (Barber et al. 2009). We found only two studies that exclusively examined the effects to ungulates from introduced noise. One study showed increased heart rates for up to three minutes after the noise was eliminated in mule deer from introduced noise levels between 92 and 112 dBA (Weisenberger et al. 1996). The other study indicated pronghorn activity is greater than expected in areas were noise levels are less than 45 decibels and less than expected in areas greater than 55 dBA (Landon et al. 2003). In order to analyze potential noise effects from well drilling and juniper cutting to native ungulates, a 45 dBA threshold was used where noise levels greater than 45 dBA are expected to negatively affect ungulates and noise levels less than 45 dBA would have no effect.

Well drilling and chainsaws produce different levels of noise, so the amount of area disturbed would vary. Well drilling produces approximately 83 dBA within 49.2 feet and a chainsaw projects approximately 110 dBA within 3.3 feet of the source. The inverse square law predicts a six dBA decrease per doubling the distance from the source. Therefore, unshielded noise (no vegetation or terrain interference) is expected to be 45 dBA when 0.8 miles from well drilling, or 1.2 miles from chainsaws. A 0.8 mile diameter around a well equates to 1,287 acres and a 1.2 mile diameter around a chainsaw equals 2,895 acres of disturbance. This analysis doesn't include sound attenuation from barriers such as vegetation and terrain. Although more than one chainsaw would be used to cut juniper, only one chainsaw was used for this analysis. Chainsaw cutters typically work in close proximity to each other, thus the effects are expected to be localized and not spread much farther than 1.2 miles from the center of activity.

Next, we used a habitat effectiveness index to determine the magnitude of these disturbances on ungulate habitat, where >70 percent of undisturbed winter habitat equals a low level of human influence, 50 to 70 percent equals a moderate level of human influence, and <50 percent is considered areas of high human influence (Gaines et al. 2003).

There are two moderately-travelled roads (2-4 vehicles/12 hours) and two major transmission lines that are located in the project area. The two roads are not located under the two transmission lines. Because elk and mule deer are known to avoid these anthropogenic features, the roads were buffered by 0.5 miles and the transmission lines by 0.6 miles (Gaines et al. 2003). The area impacted by these existing conditions is 18,800 acres, which leaves 124,227 acres (87 percent) of year round habitat for pronghorn and elk winter range, and 93,742 acres (83 percent) of mule deer winter range that is currently unaffected by human disturbance.

The sensitive period for native ungulates in the project area is from December 1 through April 15, therefore this analysis is specific to these dates and activities occurring outside of these dates are not expected to be detrimental to local populations.

Effects of well drilling

Alternatives 1 and 2: No wells would be drilled in Alternatives 1 and 2, thus native ungulates would not be impacted by this action. Approximately 124,176 acres (87 percent) of year round pronghorn habitat and elk winter range and 93,742 acres (83 percent) of mule deer winter range would continue to be available. Using the habitat disturbance index described above, the effects of well drilling on deer winter range and elk and pronghorn year round habitat would result in a low level of human influence.

Alternatives 3, 4, and 5: In each of these alternatives, five new wells would be drilled disturbing a total of 6,435 acres of ungulate habitat. Noise disturbance would be temporary, lasting for two weeks at each well. This would leave 117,741 acres (82 percent) of pronghorn year round and elk winter habitat and 87,307 acres (78 percent) of deer winter range unaffected by well drilling if all five wells were drilled simultaneously. Using the habitat disturbance index described above, the effects of well drilling on deer winter range and elk and pronghorn year round habitat would result in a low level of human influence.

Effects of chainsaw cutting

Alternative 1 and 5: Native ungulates would not be displaced by chainsaw cutting under these alternatives because areas with wilderness characteristics would not be cut. Approximately 124,176 acres (87 percent) of year round pronghorn habitat and elk winter range and 93,742 acres (83 percent) of mule deer winter range would continue to be available. Using the habitat disturbance index described above, the effects of well drilling on deer winter range and elk and pronghorn year round habitat would result in a low level of human influence.

Alternatives 2, 3 and 4: Cutting juniper trees with chainsaws is a disturbance that would displace native ungulates from an area temporarily for approximately less than one month. Animals would be displaced on up to 2,895 acres around the chainsaw workers. This would leave 121,281 acres (85 percent) of pronghorn year round and elk winter habitat and 90,847 acres (81 percent) of deer winter range unaffected by chainsaw noise. Using the habitat disturbance index described above, the effects of well drilling on deer winter range and elk and pronghorn year round habitat would result in a low level of human influence.

Cumulative effects

Past actions that continue to affect the amount of available habitat include the two major roads and powerlines described above under affected environment. No other ongoing or foreseeable actions would have an effect on pronghorn, elk, and mule deer use of the habitats.

We combined the effects of well drilling, chainsaw cutting, powerlines, and roads and compared them between the alternatives.

Alternative 1: Neither well drilling nor chainsaw cutting would occur. Existing roads and powerlines would potentially displace native ungulates from 18,800 acres leaving 124,227 acres (87 percent) of pronghorn and elk habitat and 93,742 acres (83 percent) of mule deer habitat undisturbed by roads.

Alternative 2: In addition to the acres disturbed from the powerlines and roads, chainsaw cutting would disturb native ungulates from 2,895 acres. Pronghorn and elk habitat would be reduced from the existing conditions to 121,332 acres (85 percent) and mule deer habitat would decline to 90,847 acres (81 percent). Using the habitat disturbance index described above, the effects to native ungulate habitat would result in a low level of human influence.

Alternative 3 and 4: Both of these alternatives would disturb native ungulates more than the other alternatives. The total area disturbed from well drilling, chainsaw cutting, powerlines, and roads would amount to 28,130 acres. This would leave 114,897 acres (80 percent) of pronghorn and elk habitat and 84,412 acres (75 percent) of mule deer habitat. The combined effects to native ungulates would result in a low level of human disturbance.

Alternative 5: Well drilling would displace native ungulates from 6,435 acres in addition to the acres disturbed from existing powerlines and roads. Pronghorn and elk habitat would amount to 117,792 acres (82 percent), mule deer habitat would amount to 87,307 acres (78 percent). The combined effects to native ungulates would result in a low level of human disturbance.

How would the loss of free water affect bat distribution?

Affected environment

Free water is one of the three major habitat components that bats require for survival, the others being roost sites and foraging areas. Climate models predict future declines in bat reproduction as a result of reduced annual water supply (Adams 2010). Bats fly to free water sources after leaving their day roosts to replenish water lost during the day. One study showed reproductive big brown bats (*Eptesicus fuscus*) acquire 20 percent of their water intake from drinking (Kurta et al. 1990). Free water availability is more critical for reproductive females, particularly lactating females, than males or non-reproductive females (Adams and Hayes 2008). Typically, water sources are located in close proximity to day roosts (< 0.5 miles) and are often associated with foraging areas (Ormsbee and McComb 1998, Waldien et al. 2000, Psyllakis and Brigham 2006).

Physiological adaptations allow certain bat species to conserve water more efficiently than others (Gleuso 1978). Species adapted to dry environments (i.e. pallid bat) have specialized renal functions that allow them to live in water limited environments (Gleuso 1978). Species that are adapted to wetter environments (e.g. little brown bat) lack water conservation adaptations and have likely expanded their distribution from artificial water development in the project area. Consequently, species distribution for these bats will be limited in the project area.

Acoustic bat surveys in 2007 identified the occurrence of nine bat species at 12 playas in the project area (Table 16). The sample size was 30 playas. Most of the activity came from the western small-footed

myotis (*Myotis ciliolabrum*) and the western long-eared myotis (*Myotis evotis*). A BLM special status species, Townsend's big-eared bat (*Corynorhinus townsendii*), was documented occasionally. Another special status species, fringed myotis (*Myotis thysanodes*) wasn't identified, but could occur given the presence of juniper woodlands in the project area (O'Farrell and Studier 1980).

Table 16. Bat calls at playas.

Common Name	Scientific Name	Occurrence (%)	Total # of Calls
Western Small-footed Bat	*Myotis ciliolabrum*	90%	221
Western Long-eared Bat	*Myotis evotis*	87%	408
Long-legged Bat	*Myotis volans*	43%	31
Silver-haired Bat	*Lasionycteris noctivagans*	37%	27
Big Brown Bat	*Eptesicus fuscus*	33%	44
Little Brown Bat	*Myotis lucifugus*	27%	9
Townsend's Big-eared Bat	*Corynorhinus townsendii*	10%	6
Yuma Bat	*Myotis yumanensis*	7%	3
California Bat	*Myotis californicus*	3%	1

Although bat use is probably highest in areas where all three habitat components are available, bats are capable of flying long distances between day roosts and foraging areas, and so for this analysis the entire project area is considered bat habitat.

Only water troughs and playas with dugouts were included in this analysis. Playas without dugouts are not likely to hold water at the time of year when bats are presumed to arrive in the project area therefore these features were not included in this analysis.

For this analysis we assume higher densities of water sources and less distance between water sources make bat populations healthier.

Water is distributed unevenly across the project area. The Hampton allotment contains the highest water densities, followed by Ram Lake, and ZX (Table 17). The average distance between water sources is lowest in the Ram Lake allotment, then Hampton and ZX.

Effects

Alternative 1: Water distribution would not change, therefore bat distributions would not be effected in under this alternative. The Hampton allotment would contain the highest water density (0.7), followed by Ram Lake (0.34), and ZX (0.13). Water density in the Hampton allotment would be greatest under Alternative 1. Whereas, in the Ram Lake allotment water density in Alternative 1 would be greater than Alternative 2, but less than Alternatives 3, 4, and 5. In the ZX allotment, water density in Alternative 1 would be greater than Alternative 2, less than Alternatives 3 and 4, and the same as Alternative 5.

Alternative 2: This alternative would reduce the amount of water sources the most. Water density in all three allotments would be less than the other alternatives (Table 17). The greatest reduction in bat distribution would occur in the Hampton allotment where approximately half of the allotment provides suitable roosting habitat in the form of old-growth juniper trees and rock crevices. In the Ram Lake allotment three out of the four pastures would retain water sources where roosting habitat is plentiful.

Water would be eliminated in three pastures in the ZX allotment that currently have limited water and roosting habitat.

Alternatives 3, 4 and 5: Bat distribution would be similar between these alternatives because water distribution is relatively equal. These alternatives are distinguished from Alternative 1 because the artificial water development type changes. In Alternative 1, dugouts are the primary source of free water for bats, whereas Alternatives 3, 4 and 5 minimize water loss from filling dugouts by installing new water troughs.

Several factors between dugouts and troughs may influence water availability for bats. Dugouts provide larger surface areas than water troughs. Bat activity and species richness increases with greater surface area at artificial water developments (Rabe and Rosenstock 2005, Taylor and Tuttle 2007). Small surface areas at water developments can cause bats to increase the number of passes needed to drink, thus increasing energy expenditure (Tuttle et al. 2006). So, although water would be replaced, bat use could potentially decrease. Another distinction between the two water sources is dugouts generally provide more water for longer periods of time than troughs. On average and above precipitation years, most dugouts hold water through late summer, whereas troughs only have water when cattle are in the pasture where the trough is located. Contrary to this, water troughs may provide a more consistent water source than dugouts if climate models are accurate in predicating that natural water sources will be less available in the future (Adams 2010).

Table 17. Water source density per square mile and average miles between water sources.

Allotment	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Hampton	0.7 (4.8)	0.11 (5.6)	0.5 (4.9)	0.66 (5)	0.64 (5)
Ram Lake	0.34 (3)	0.19 (2.4)	0.44 (2.2)	0.44 (2.2)	0.39 (2.3)
ZX	0.13 (6.3)	0.03 (3.2)	0.15 (6.3)	0.17 (6.1)	0.13 (6.7)

How would filling dugouts affect waterfowl?

Wetland habitats (including playas) with open water, emergent vegetation, and food resources are important breeding, migration, and wintering habitats for waterfowl. Although classified as temporary wetlands, some playas do not provide suitable waterfowl habitat. For example, silver sagebrush playas without dugouts lack open water and emergent vegetation, although they may sometimes contain aquatic invertebrates during above average precipitation years. Whereas, lakebed playas generally provide all three waterfowl requirements annually, except during drought years. Consequently, prior to excavating playas to create dugouts during the 1950s - 1970s, waterfowl habitat was limited to seven lakebed playas in the project area.

Dugout development on silver sagebrush playas has created artificial stopover rest areas for migratory waterfowl. Silver sagebrush playas with dugouts do not provide suitable nesting and brood-rearing habitat (Ringleman 1992) due to the lack of vegetation from concentrated grazing pressure around these dugouts. However, because dugouts provide invertabrates, playas function as foraging areas for most species until the middle of summer (Fredrickson and Reid 1988). In addition to the seven lakebed

playas which contain dugouts, there are 34 silver sagebrush playas with dugouts that provide migratory stopover habitat during spring.

The project area is located in the migratory path known as the Pacific flyway. During spring and fall, waterfowl use wetland habitats along this path to rest and forage. Although lakebed playas and silver sagebrush playas with dugouts in the project area provide small, temporary habitat for migrating waterfowl, there are larger, permanent wetland habitats to the east (Malheur Wildlife Refuge) and south (Warner Wetlands, Klamath Marsh, and Abert, Silver and Summer Lakes) that are also within the Pacific flyway and provide nesting and brood-rearing habitats. During 2007, breeding bird surveys were conducted on 36 playas in the project area and although individual birds were not counted consistently across the surveys, the total number of individual waterfowl was probably less than 100 (unpublished data BLM). In contrast, Silver Lake averaged 36,800 birds between September and October of 2011 (ODFW 2011).

Historically, waterfowl habitat was limited in the project area. Dugouts create artificial migratory rest areas, but do not support nesting and brood-rearing activities on silver sagebrush playas. In addition, there are more suitable wetland habitats in Oregon along the Pacific flyway. Therefore, the action of filling dugouts is not expected to measurably affect waterfowl populations and is not considered in further detail.

How would livestock concentrations around water sources affect pygmy rabbits?

The pygmy rabbit is a BLM Sensitive Species that is closely associated with sagebrush plant communities. Habitat selection is often related to high shrub cover and height, soil composition and depth, and the absence of cottontails (*Sylvilagus nuttallii*) and cheatgrass (*Bromus tectorum*) (Weiss and Verts 1984, Katzner and Parker 1997, Heady et al. 2001, Larrucea and Brussard 2008). Pygmy rabbits establish burrows in areas of greater sagebrush cover and height than adjacent sites (Weiss and Verts 1984, Heady et al. 2001, Larrucea and Brussard 2008). Taller shrubs are especially important during winter (Katzner and Parker 1997) when rabbits predominately forage on sagebrush (Green and Flinders 1980). Pygmy rabbits dig their own burrows in varying soil types and depths throughout their range. Average soil depth of occupied sites in Oregon was 51 cm, with a mixture of sand (51 percent), silt (30 percent), and clay (19 percent) (Weiss and Verts 1984).

Pygmy rabbits have a small home range that decreases from summer to winter. Home ranges during summer differ sexually, with males covering more area (50 acres) than females (6.7 acres) (Gahr 1993, Sanchez and Rachlow 2007). Both sexes have a home range that averages 2.5 acres during winter (Katzner and Parker 1997). There is no evidence of migration behavior in pygmy rabbits (Keinath and McGee 2004).

Livestock grazing can have both positive and negative impacts to pygmy rabbits. A species assessment in Wyoming described positive effects as increased grass vigor and shrub densities, and attributed smaller home ranges, fewer burrows, and lower nutritional forage with negative effects (Keinath and McGee 2004). The assessment also found burrow trampling, removal of residual herbaceous cover and increased predation at artificial livestock water sources (Keinath and McGee 2004).

Following the habitat criteria above, there are approximately 54,000 acres of suitable habitat in the project area. More than 15,000 acres of this suitable habitat has been surveyed for pygmy rabbits in the ZX (7,680 acres) and Hampton (7,680 acres) allotments. Pygmy rabbits have not been documented thus far in the project area.

In order to eliminate the negative effects associated with high livestock concentrations around new water developments on pygmy rabbits, new water developments would not be located within ½ mile of a pygmy rabbit burrow (see PDF number 3 on page 14). Therefore there would be no measurable effects on pygmy rabbit habitat and this issue is not analyzed in further detail.

Would any of the proposed actions described in the action alternatives affect bald or golden eagles?

Bald eagle: Bald eagles are usually associated with large bodies of water, but can occur in any habitat with available prey, and they nest primarily in forested areas near the ocean, along rivers, and at estuaries, lakes and reservoirs (Marshall et al., 2003). They nest in large older trees that provide suitable structure to support their large nests. Isaacs and Anthony (1989) found 84 percent of Oregon nests were within one mile of water however, a nest in the Ft. Rock Valley was the most distant from water at 18 miles from the nearest shoreline.

The project area provides atypical foraging opportunities for bald eagles and very limited amounts of nesting habitat due to distance from significant water sources. There are no known bald eagle nests or roost sites in the project area or important habitat features within the project area. Bald eagles are regularly seen outside but adjacent to the project area to the northeast, soaring or perched on irrigation wheels in the fields near Hampton, Oregon.

In all action alternatives, the project area would be surveyed prior to project implementation to ensure no nest or roost sites are present. If nest/roost sites are discovered, seasonal restrictions (as detailed in Chapter 2) would keep disturbances from occurring during sensitive periods, and limits on tree cutting would protect nesting and roosting areas. The proposed actions described in this EA are not expected to measurably affect individuals or populations of bald eagles and the effects are therefore not considered in further detail.

Golden eagle: According to Marshall et al. (2003), “the golden eagle inhabits shrub-steppe, grassland, juniper, open ponderosa pine, and mixed conifer/deciduous habitats. It forages in a variety of habitat types and successional stages, preferring areas with an open shrub component that provides food and cover for prey.” Golden eagles usually require ledges on cliffs for nesting (Csuti et al., 2001), but also nest in large mature trees.

The entire project area provides suitable foraging habitat for golden eagles and there is one active nesting territory in the project area, but no known roost sites. The project area primarily provides trees not cliff ledges for nesting opportunities. In general, eastern Oregon, the Willamette Valley of northwestern Oregon, and portions of southwestern Oregon are typical golden eagle habitat with large open areas for hunting and abundant cliffs, rock outcrops, or trees for nesting (Isaacs 2013, unpublished

report). According to Isaacs (2013), there were approximately 551 breeding pairs and 517 young in Oregon during the 2012 breeding season.

The effects of the proposed actions of juniper thinning and silver sagebrush mowing is expected to improve foraging habitat for golden eagles because they would promote open shrub-steppe and juniper woodland conditions that supports abundant prey and offers desirable hunting conditions.

Current playa conditions such as existing dugouts provide useful habitat conditions for some prey as well (e.g., waterfowl). Filling dugouts and restoring playas would change habitat conditions for different prey species that golden eagles feed on. Future proposed playa restoration treatments could reduce the depth and shorten the amount of time open water would be available for wildlife therefore altering which species use it, the time of year they would use it, and the length of time they would use playas. These changes could be subtle for some species (e.g., coyote) while others (e.g., waterfowl) could have greater changes.

Because of the small amount of habitat that would be affected from playa restoration actions relative to the abundant supply of habitat in the project area and in eastern Oregon, the positive and negative effects would be minor. As individual actions that would be implemented from the decision in this EA, the project area would be surveyed to ensure no nest or roost sites are present. If nest/roost sites are discovered during project clearances, seasonal mitigations would keep disturbances from occurring during the sensitive period and tree diameter limits would protect nesting and roosting substrates. The effects of the proposed actions described in this EA are not expected to measurably affect individuals or populations of golden eagles and are not considered in further detail.

Would any of the proposed actions described in the action alternatives affect migratory birds and birds of conservation concern (BOCC)?

Migratory and Resident Birds of Conservation Concern

Executive Order 13186 (66 Fed. Reg. 3853, January 17, 2001) "Responsibilities of Federal Agencies to Protect Migratory Birds" directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. This Executive Order also requires federal agencies to develop Memorandum of Understandings (MOU) with the FWS to conserve birds including taking steps to restore and enhance habitat, and incorporating migratory bird conservation into agency planning processes. The BLM has completed a MOU and is currently implementing provisions included in the MOU with the USFWS such as:

- At the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and focusing first on species of concern, priority habitats, and key risk factors.
- Integrate migratory bird conservation measures, as applicable, into future Activity Management Planning. This will address habitat loss and minimize negative impacts.

The appropriate Bird Conservation Plan (Altman and Holmes, 2000) and Birds of Conservation Concern (BOCC) species list, developed by the U.S. Fish and Wildlife Service (USFWS), for the project area was reviewed. Those species and habitats that are within the project area are incorporated and effects briefly disclosed in this analysis in Chapter 3. As described on page 25, the wildlife analysis uses a focal species approach which allows us to display effects on groups of wildlife species where effects would be similar, rather than repeating similar information for a large number of individual species.

While many issues may arise during scoping, not all warrant analysis in an EA. The NEPA directs us to analyze issues if the analysis is necessary to make a reasoned choice between alternatives or if the significant issues are those related to significant or potentially significant effects. Therefore the potential effects to BOCC are briefly displayed.

Table 18 displays a list of the BOCC that are known or likely to be present in the Planning Area and their habitats that could be affected by the proposed actions. Bird Conservations Regions (BCRs) were developed based on similar geographic parameters. One BCR encompasses the project area, BCR 9 (Great Basin), and is displayed in the map below (Figure 5).

Figure 5. Bird Conservation Regions in North America with similar bird communities, habitats, and resource management issues.

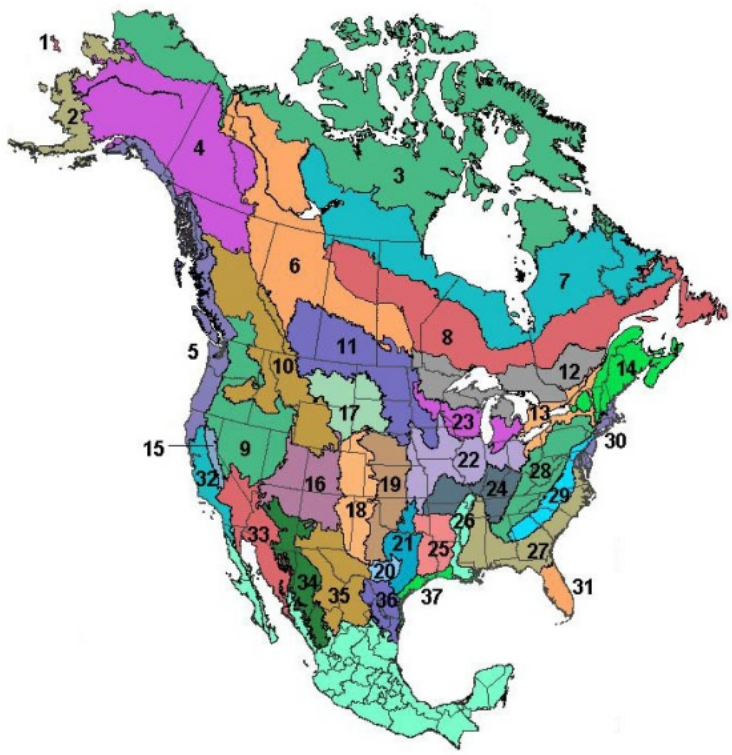


Table 18. Birds of Conservation Concern BCR 9 (Great Basin, U.S. portion only).

Species	Preferred habitat	General effects to habitat
Eared Grebe (non-breeding in this BCR)	Found on shallow alkaline lakes and ponds where open water is intermixed with emergent vegetation.	Actions that improve playa ecological conditions would positively affect their habitats.
Loggerhead Shrike	Inhabits grasslands, pastures with fence rows, agricultural fields, sagebrush with scattered juniper and open woodlands. Requires elevated perches throughout for hunting and nesting.	Actions that maintain/improve shrub-steppe and open juniper woodlands would positively affect their habitats.
Pinyon Jay	In Oregon, pinyon-juniper woodland, sagebrush, and scrub oak habitats.	Actions that maintain improve juniper woodlands would positively affect their habitats.
Sage Thrasher	A sagebrush obligate dependent on large patches and expanses of sagebrush steppe and bitterbrush with shrub heights in the 30 - 60 cm height. Prefers bare ground over grassy understories.	Actions that maintain/improve shrub-steppe habitats would positively affect their habitats.
Virginia's Warbler	In Oregon, likes high elevation steep-sloped, xeric, pinion- juniper and oak woodland habitats.	Actions that maintain improve juniper woodlands would positively affect their habitats.
Green-tailed Towhee	In Oregon, prefers vigorous shrub stands with high shrub species diversity interspersed with trees.	Actions that maintain/improve shrub-steppe habitats would positively affect their habitats.
Brewer's Sparrow	A sagebrush obligate found in shrublands of contiguous big sagebrush, greasewood, rabbitbrush, and shadscale habitats.	Actions that maintain/improve shrub-steppe habitats would positively affect their habitats.
Ferruginous Hawk	Occupy habitats with low tree densities and topographic relief in sagebrush plains of the high desert and bunchgrass prairies in the Blue Mountains.	Actions that maintain/improve shrub-steppe and open juniper woodlands would positively affect their habitats.
Greater Sage-Grouse	See specific analysis in this EA.	
Bald and Golden Eagles	See specific analysis in this EA.	

Wilderness characteristics

To possess wilderness characteristics an area must: a) contain at least 5,000 acres of contiguous BLM public lands, b) be natural appearing to the casual observer; and, c) provide outstanding opportunities for solitude and/or primitive and unconfined types of recreation.

Two areas within the project area possess wilderness characteristics: The Waterhole unit and the Frederick Butte unit, shown on maps in Appendix C. The BLM inventory for these units was completed in 2008-2009 and is available for review at Prineville BLM. All 13,672 acres of the Frederick Butte unit are

on Prineville District BLM in the project area; 34,492 acres of the Waterhole unit are on Prineville District in the project area and 10,114 acres are on Lakeview BLM outside the project area.

During scoping for this EA, the BLM determined that the aspects of wilderness characteristics that would potentially be affected are naturalness and solitude. The current condition, trends, and expected effects on these two characteristics are described below.

How would juniper thinning, fences, wells, pipelines, water tanks, troughs, roads and filling in dugouts affect the appearance of naturalness in areas with wilderness characteristics?

Affected environment

Naturalness is present when an area "…appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable…" – Wilderness Act of 1964, Section 2(c). Naturalness within the project area is affected by manmade intrusions such as water tanks, wells, troughs, fences and roads, and by vegetative treatments including seedings and juniper cuts.

While all 48,164 acres of public land in the two units on the Prineville District are substantially naturally appearing, some portions of the units have fewer manmade improvements. For the purposes of this EA, we measured naturalness by counting acres not within: a) 1/8 mile of a water tank, well, trough, b) ¼ mile of a fence in a playa (fence in sagebrush are even less visible); and, c) 1/8 mile of a road. Manmade intrusions at distances farther than this become unnoticeable. Areas within a juniper cut from 10 or fewer years ago are also counted as unnatural for the purposes of this EA. Using this methodology, the area currently appearing natural is 11,586 acres in the Frederick Butte unit and 31,158 acres in the Waterhole unit.

Associated with the BLM permitted grazing operations, there are a number of fence lines and pipelines which cross portions of the units, but which are substantially unnoticeable. There are spring developments present but they do not detract from the natural condition. There are a number of routes that are being used for access through the area by the public, private landowners and grazing permittees. Some of the routes are substantially unnoticeable while others are noticeable locally. Some are rarely used and are naturally rehabilitating. The units are Open for OHV use, which means that cross-country use is permitted, but effects from this use are not currently noticeable.

Several seedings done over 30 years ago have now mostly reverted to a more natural condition. In 2009, the BLM cut 1,935 acres of juniper within the Frederick Butte unit (July 2009 Decision Record for DOI-BLM-OR-P060-2009-0036-EA, available on BLM public website). Juniper cuts are apparent, mainly due to visibility of cut stumps, and color contrasts from dead juniper needles in medium-dark green juniper stands. Downed tree trunks can persist on site for decades. After about 10 years, the cuts become less noticeable as the trees turn gray or are burned, needles fall off, and understory vegetation re-establishes and partially screens the stumps and downed trunks.

Even though some areas within a unit may not appear natural, the whole unit can still be found to possess wilderness characteristics; not every acre needs to meet the criteria for naturalness (BLM Manual).

Effects

The action alternatives all include cutting juniper trees no higher than six inches above the ground, meandering cut areas to mimic a natural ignition, burning cut juniper, and leaving a 300 foot uncut buffer next to roads. These actions would reduce the evidence of cut juniper and contrasts between cut and uncut landscapes. Regardless, for this analysis recent cuts are considered unnatural appearing.

The analysis below presents effects for **short term** effects at 10 years, when juniper thinning would be complete on half the acres. The cuts done the first year would not appear natural yet, so effects would be at their greatest. At 10 years, we assume all structural developments would have been installed (or removed, depending on the alternative). Temporary fences would be removed within seven years, so the effects from these fences would not be counted in the short or long term effects (per BLM VRM Manual direction).

The **long term** effects presented below are after 30 years (about 2043), when all juniper cuts are over 10 years old and therefore assumed to be natural appearing again. Temporary fences would have been removed within 10 years, so their effects are not counted in either the long or short term results. The effects (except cumulative) are for the portions of the units within the project area.

In the long term, Alternative 2 would provide the most acres naturally appearing (47,846 acres), followed by Alternative 5 (45,372 acres), then Alternative 1 (44,679 acres). Alternative 3 (40,624 acres) and Alternative 4 (4,623 acres) retain the least. These effects are described in more detail below.

Under Alternative 1, the existing landscape would not be altered by juniper thinning, or by new fences, troughs or other new developments. The 1,935 acre juniper cut in the Frederick's Butte unit (described above in affected environment) would be natural appearing again by 2020. There would be no decrease in acres that appear natural. Naturalness would continue to be present (both short and long term) on 13,521 acres of the Frederick Butte unit, and 31,158 acres of the Waterhole unit. These are the areas not meeting the criteria presented above regarding distance from developments and recent juniper cuts. The short and long term effects are the same in this alternative.

Alternative 2 has no new livestock developments and removes almost 90 miles of existing pasture fences. The fence removal would increase naturalness on both units in the short and long term. This increase would be offset by juniper cuts in the short term, for a net decrease in acres appearing natural of 5,839 acres in the Frederick Butte unit and 13,794 acres in the Waterhole unit at the ten year mark, compared to Alternative 1. In the long term, naturalness would increase by 31 acres in the Frederick Butte unit and 3,136 acres in the Waterhole unit, compared to Alternative 1. This alternative provides the most naturalness, followed by Alternative 5, then 1.

Alternative 3 includes new permanent wells, water tanks, troughs, and pipelines, as well as road re-routes and juniper cuts and no fence removal. The net decrease in naturalness would be 8,407 acres in the Frederick Butte unit and 18,478 acres in the Waterhole unit at ten years compared to Alternative 1. After 30 years the juniper cuts would no longer be affecting naturalness, but the developments would still have decreased naturalness from the existing situation. After 30 years, naturalness would be apparent on 2,507 fewer acres in the Frederick Butte unit and 1,548 fewer acres in the Waterhole unit,

compared to long term Alternative 1. Temporary fences would affect some areas but these effects would be gone within seven years and are therefore not presented in the short term (10 years) or long term effects. This alternative and Alternative 4 provide the fewest acres naturally appearing.

Alternative 4 includes more troughs and more permanent fences than Alternative 3, but no temporary fences or fence removal. The net decrease in naturalness would be 7,971 acres in the Frederick Butte unit and 18,885 acres in the Waterhole unit at ten years. After 30 years naturalness would be apparent on 2,507 fewer acres in the Frederick Butte unit and 1,548 fewer acres in the Waterhole unit, compared to existing. This alternative and Alternative 3 provide the fewest acres naturally appearing.

Alternative 5 would include more temporary fences, but no permanent fences and no juniper cuts in areas with wilderness characteristics. The net difference would be a decrease in naturalness of 88 acres in the Frederick Butte unit and an increase of 605 acres in the Waterhole unit at ten years. The effect after 30 years would be the same as after 10 years. As in Alternative 3, effects from temporary fences are not presented in the effects analysis since the effects would be gone in seven years. This alternative ranks second (behind Alternative 2) for providing the most acres naturally appearing.

Cumulatively: There are no ongoing or future actions on either the Prineville or Lakeview portions of these units that are expected to have an effect on naturalness, and therefore there would be no additional effect on wilderness characteristics.

Table 19. Areas with wilderness characteristics that appear natural.

	Now	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term
Acres appearing natural	42,744	44,679	44,679	25,046	47,846	17,794	40,624	17,823	40,623	45,372	45,372

How would juniper thinning affect outstanding opportunities for solitude?

The quality of a wilderness experience is affected by encounters with other people, or the feeling of solitude. Factors that contribute to providing outstanding opportunities for solitude include the size and shape of an area, the density and character of vegetative screening, topographic relief/slope, route density, accessibility of the area, and amount of visitation.

Most areas in the units have ample topography and vegetation screening, low density of primitive routes, and limited use by the public and the livestock grazing operators. The expectation of meeting someone in this region, even on the established vehicle ways, is remote.

The only action proposed in this EA that could affect solitude is the removal of vegetative screening by thinning young juniper. Due to the amount of old growth juniper that would still provide vegetative screening to allow visitors to avoid seeing others in the same area, this action is not expected to reduce outstanding opportunities for solitude. Cutting stands of young trees outside old growth areas would

allow longer range views, potentially increasing the chance of seeing another visitor; however, topographic screening, remaining old growth stands and limited visitation would prevent any changes in opportunities for outstanding solitude. Therefore, this issue is not considered further in this analysis.

Visual resources

How would juniper thinning, fences, wells, pipelines, water tanks, water troughs and road maintenance affect visual resources?

Affected environment

The project area possesses a variety of landform and vegetation features that contribute to the area's scenic quality. Ibex, Stud Horse and Frederick Buttes are prominent landmarks seen from U.S. Highway 20 to the south and beyond. The landscape closest to this highway is a combination of valleys and low elevated plateaus with bunchgrasses, crested wheatgrass and sagebrush.

The project area includes a combination of previous range projects, witnessed by old crested wheatgrass seedings and old broken PVC pipe along roads. There are also some active, functioning water lines, troughs and maintained roads in the project area. Farther south, the topography is more diverse, with rimmed basalt plateaus, dry canyons, old growth juniper, and wide open spaces are valued by those recreating on public land, as well as by those driving on Highway 20 and the Frederick Butte Road.

Vegetation is a mixture of open grassland, dense sagebrush, and a stands of juniper mainly in the south and western portion of the project area. This is seen as a stippled or mottled pattern of dark green juniper against a light green or brown background, depending on the time of year. The lower slopes of buttes are a more consistent dark green color due to juniper cover than the upper elevation areas which are seen in greater relief.

One of the most striking visual features of the project area is the opportunity for long range views. There are numerous locations with high quality views, including foreground views of native grasses and rugged old growth junipers, and vantage points with dramatic views of the high desert and buttes.

The Brothers/La Pine RMP (USDI 1989) directed BLM to manage most (90 percent) of the project area as visual resource management (VRM) Class IV, where the level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

The other 10 percent of the project area is VRM Class III, where the level of change to the characteristic landscape can be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the base elements found in the predominant natural features of the characteristic landscape.

Effects

Actions proposed in this EA that may have an effect on the scenic quality of the project area include thinning of juniper and shrubs, development or closure and rehabilitation of roads, construction or removal of fences, and installation of water tanks, pipelines and troughs.

Effects on visual resources are measured by the degree (none, weak, moderate or strong) and type of change in visual contrast between the existing and future condition as seen from key observation points (KOP), as described in BLM Manual 8431-1:

- **None** = The element contrast is not visible or perceived.
- **Weak** = The element contrast can be seen but does not attract attention.
- **Moderate** = The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong** = The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Contrast is rated for characteristics of form, line, color and texture. The BLM would set KOPs prior to project implementation, and view the effect of the proposed actions on visual contrast as seen from these KOPs. The BLM would then apply design features (as described in this EA) so long term effects would not exceed moderate in VRM III. In VRM IV, effects could be strong, though BLM could apply design features to reduce effects to visual quality in these areas, too.

Given the distance from management actions to likely KOP locations, the BLM expects contrasts seen from KOPs to not exceed weak in any alternative, even without application of project design features.

Under Alternatives 1 and 5, no juniper thinning would occur, so there would be no change in visual quality.

Under Alternatives 2, 3 and 4, visual effects resulting from juniper thinning would result in short term increase in color contrast, but there would not be a change in texture contrast. The existing texture of the landscape is mottled or rough, regardless of whether or not there have been vegetative treatments. While the ultimate effect is a “weak” change in visual contrast in all alternatives (the contrast can be seen but does not attract attention), the more specific effects leading to this are described below. Short term effects described below are those that last less than five years (per BLM manual direction), whereas long term effects are those persisting after ten years.

Juniper and silver sagebrush treatments: Limited topographic relief and old growth juniper tree stands in the project area would help reduce visual color, line and form contrasts, and short-term visual effects of the 45,589 acres (maximum) of juniper thinning. Mowing 890 acres of silver sagebrush would result in vegetative texture, linear and color contrasts, but these effects would be short term and only extend about 1/8 mile around these mowed areas. Over the long term, the proposed juniper and silver sagebrush treatments would increase vegetative diversity and help highlight old growth juniper trees, increasing visual quality. Patches of old growth juniper tree stands in the project area would help reduce visual color, line and form contrasts from the proposed action.

Road/route adjustments: Sixteen to twenty miles of existing vehicle routes closed through playas, as proposed in Alternatives 2-5, and the creation of eight miles of new vehicle routes created around playas would only be visible from ¼ mile away or less. Route closures would be rehabilitated over time and not be apparent in the long term.

Fences: Construction of 13-21 miles of permanent fence would be new linear features on the landscape. Fences would be most apparent at road intersections, and least apparent from ¼ mile or more away due to vegetative screening provided by sagebrush and juniper stands. The shiny wire would also oxidize over time, becoming less apparent. Seventeen miles of temporary fence would have the same short-term visual effects as permanent fences, but there would be no long term effects.

Wells and water storage tanks: Five wells and ten water tanks would attract attention within ¼ mile of these developments. Farther away, tanks would not be apparent due to topographic and vegetative screening and coloration of the tanks to blend with the surrounding landscape. Wells would be less apparent, due to their small size and coloration of the well housing. These effects would be present in both the short and long term.

Water pipelines: 17-23 miles of buried pipeline next to roads or primitive routes would not have long term visual effects in areas with clay or sandy soils. Pipelines buried in rocky soil areas would be more apparent and have long-term effects, leaving linear lines of rock on the surface, resulting in color, linear, form and texture contrasts with the surrounding landscape. Pipes laid on the surface would also be apparent in the short and long term, but effects would only be visible within ¼ mile in sagebrush areas and less in areas with juniper. Contrasts would be further reduced by dispersing exposed rocks away from the pipeline area.

Water troughs: Removal of troughs in Alternative 2 would enhance visual quality in the short and long term. Installation of 17-22 new troughs would not attract attention for long distances, if the sides of the troughs were painted to blend with the landscape.

Dugouts: Depending on the alternative, filling 34-44 dugouts would have increased short-term visual effects, resulting from soil color contrasts, form, linear and texture contrasts. These contrasts would be more apparent from higher elevations, looking at lower elevated terrain where the dugouts are located. These disturbed areas would be seen for miles from higher elevations and would contrast with the surrounding vegetation and soil color for approximately five years. However, in the long term would not be apparent, or contrast if seeding with native shrub and grasses occurred. Seeding the dugouts would further reduce visual contrasts in filled dugouts over the short and long term.

For <u>cumulative effects</u> of the proposed action combined with other ongoing and proposed actions adjacent to the project area, we used the same analysis area as for direct effects. The primary action that would combine with the proposed actions is juniper cuts under the 2011 HDSS EA Decision (cuts within the project area but in areas without wilderness character). The effects would be similar to the effects to those of the proposed action. That is, they would produce a weak change in the level of contrast visible from KOPs. The combination of these with the current actions proposed in this EA would still be a weak change in visual contrasts between natural landscapes and landscapes altered by the

proposed actions; that is, the element contrast would be visible but would not attract attention. This is true for all action alternatives.

Economics

How would the reduction in permitted grazing use affect permittees and the local economy?

Affected environment

The proposed action that would affect the amount of permitted grazing use is the fencing of playas to exclude livestock grazing, or in the case of Alternative 2, the removal of livestock grazing from the entire project area so that fences around playas are not necessary. A reduction in permitted use would economically affect the grazing permittees, and therefore affect the local economy.

The affected environment for this economic analysis includes the specific permittees and counties that would lose revenue or jobs as a result of reduced permitted grazing. This section first describes the permittee operations in the project area and the current economic conditions and trends in the counties that would be affected.

There are three livestock grazing permittees, each with grazing privileges on one of the three allotments: Hampton, Ram Lake and ZX. The allotments contain 12,796 acres, 53,513 acres and 76,000 acres of public land, respectively. The Ram Lake and ZX allotments fall entirely within the project area. The Hampton allotment includes another 4,545 acres north of Highway 20 and outside of the project area; this portion of the allotment is held by a different grazing permittee, and is not included in this analysis. The ZX permittee typically runs four herds of 400 to 1,000 head each in the six pasture allotment, leaving two pastures ungrazed each year. The Ram Lake permittee typically runs one herd of 200 to 300 head, leaving two of the four pastures ungrazed each year. The Hampton permittee typically runs two herds of 200 to 500 head, resting at least one of the 13 pastures each year. These numbers are subject to change yearly based on annual operator meetings with the BLM. Regardless of herd size, AUMs do not exceed permitted AUMs.

The local economy that benefits from grazing varies by allotment; the effects are felt most in the counties where the permittees live, shop, hire employees, and sell cattle. For this analysis, we assume that about 80 percent of the effects from the Hampton and Ram Lake Allotments would fall in Lake County Oregon, and the other 20 percent would fall in Deschutes County. The ZX Allotment permittee told the BLM the majority of the effects would fall in Lake and Deschutes Counties, as well as in Elmore County Idaho and Walla Walla County in Washington, so effects are assumed to be split between those four counties.

Livestock grazing is an important part of the local economy in most of these counties. Table 20 shows the contribution of farm earnings (of which cow/calf sales are a part) in these counties relative to total personal income. Lake County is currently most dependent on farm income; 5.5 percent of county income was farm related in 2001, increasing to 9.0 percent in 2012. Deschutes County does not depend

on farm income, and less so now compared to 2001; in fact it has registered as a loss in recent years. Elmore County farm earnings in 2012 were 4.5 percent of the total income in the county, down from 7.5 percentin 2001. Farm earnings in Walla Walla County declined from 9.4 percent in 2001 to 7.4 percent in 2012.

Table 20. Personal income and farm earnings in the affected counties.

County	Total income (thousands of dollars)		Farm earnings (thousands of dollars)		Farm earnings as percent of county income	
	2001	2012	2001	2012	2001	2012
Deschutes	3,480,894	6,239,199	-4,569	-17,086	--	--
Elmore	659,191	957,417	49,803	43,616	7.5	4.5
Lake	183,953	269,246	10,045	24,233	5.5	9.0
Walla Walla	1,402,970	2,221,407	131,367	164,811	9.4	7.4

Source: US Department of Commerce 2014.

The use these permittees are currently allowed on these allotments in terms of AUMs and grazing period is shown in Table 21 below. As mentioned in Chapter 1, an AUM is the amount of forage required to sustain one cow and her calf for one month. Active use is the maximum amount of AUMs the permittee can use in any one year. There are currently no AUMs in suspension on the permits; AUMs in suspension are potentially available on the allotment but not currently available to the permittee. The permitted AUMs and contribution to the local economy has been similar for the last twenty years. Permitted use is the dates during which grazing can occur, though livestock may be on the allotment for a shorter period. The portion of the Hampton allotment in the project area includes 13 pastures, typically grazed from mid-April to mid-November. Ram Lake has four pastures which are generally grazed in the spring and summer. The ZX Allotment has six pastures and is usually grazed April through August.

Table 21. Current permitted livestock grazing.

Allotment name	AUMs active	Permitted Use	Actual Use
Hampton #00003	6,899	4/16 – 11/15	4/16 – 11/15
Ram Lake #05245	812	3/1 – 2/28	4/1 – 8/1
ZX #15238	7,100	3/1 – 2/28	4/1 – 9/1

Effects

This section explains how AUM losses would translate into economic losses to permittees, and how these would relate to local economies.

The BLM used a model called IMPLAN to estimate economic effects. Total expected annual net revenue in the model equals expected annual revenue minus expected annual costs. Expected annual revenue includes proceeds from calf sales and sale of excess cattle. Expected annual costs include herd maintenance costs, herd moving costs, "off-allotment" feeding costs, grazing permit costs, and any costs resulting from the purchase of additional cattle. The model does not include ranch operations' fixed costs, costs or returns on land investments, or depreciation.

In all action alternatives, permittees would generate less revenue. Net annual revenue to permittees would be greatest in Alternative 1 ($1,464,538), followed by Alternative 4 ($1,337,536), Alternative 5 ($1,336,607), Alternative 3 ($1,313,734), then Alternative 2 ($0), as displayed in Table 22 below. In Alternative 5, revenue would be reduced for the first seven years (or less), because some AUMs would be placed in suspension while temporary fences are in place around playas; once temporary fences are removed, revenue in Alternative 5 would be the same as in Alternative 1. In all other alternatives, revenue would be the same long term as short term.

Table 22. Net annual revenue to permittees (dollars) while temporary fences are in place (short term).

Allotment	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Hampton	418,809	0	289,358	301,504	300,678
Ram Lake	107,322	0	104,846	105,465	105,465
ZX	938,407	0	919,530	930,567	930,464
Total	**1,464,538**	**0**	**1,313,734**	**1,337,536**	**1,336,607**

The local economy would benefit most from those alternatives where permittee revenue is greatest. Every dollar in net revenue to permittees amounts to almost twice that in benefits to the local economy from additional spending by suppliers and employees (IMPLAN SAM and Census of Ag SAM Multiplier and Revised BLM Grazing Impacts Methodology).

For the ZX permittee, the ZX Allotment contributes approximately 30-50 percent of their entire grazing operation in the state of Oregon. If Alternative 2 were selected, the loss of AUMs would not likely make their operation non-viable, but it would have a severe negative impact on their operation. For the Ram Lake and Hampton permittees, the allotments contribute approximately 70 percent of their entire grazing operation in the state Oregon. If Alternative 2 were selected, the loss of these AUMs would most likely make their operation non-viable.

Cumulative effects: There are no other actions that would have a measurable effect on the local economy when combined with the above direct and indirect effects. The BLM is currently preparing an EIS that analyzes a number of actions to protect and enhance sage-grouse habitat; however, the outcome of that EIS is still unknown so the effects of those actions are not analyzed here.

How would installation of water developments and cross fencing affect permittees and the local economy?

Grazing permits include a number of mandatory terms and conditions, including a requirement to maintain assigned range developments. Currently the permittees are responsible for fence maintenance, except for fences around areas excluded from grazing, which the BLM maintains. The permittees also maintain wells, pipelines and troughs in the allotments. The BLM maintains the roads. The permittees cover all operational costs, such as checking and starting up pumps at wells. The BLM considered these costs as it developed the EA, using assumptions including:

- New developments would be functional prior to filling in dugouts and fencing playas that serve as livestock water sources.

- If new developments do not function properly, the BLM would fix or remove them and leave associated dugouts unfilled/unfenced.
- Storage tanks and troughs would hold enough water to support livestock in the pasture for three days in case of problems with a well, pipeline or trough.
- Permittees would assist BLM in siting wells to ensure they are in a location the permittee can service as needed without much more effort than currently.
- The permittees already check their livestock, dugouts and existing fences and water developments on a regular basis, and checking new developments in the same or nearby areas would not add a lot of cost.
- Wells and troughs would require more maintenance than dugouts in playas, but clean, permanent, reliable water would provide an economic benefit, offsetting the increased cost to maintain new water developments.

A permittee provided the BLM an itemized list of operational costs associated with grazing livestock in the allotment. Annual operating costs related to management of livestock grazing in the project area include labor (e.g., employee salaries), equipment (e.g., annual cost and depreciation on pickup truck, generators for well pumps), and materials (e.g., wire to patch fences, fuel for generator or pickup truck).

Given the information from the permittee, and the assumptions stated above, the BLM estimated additional costs would be offset by economic benefits; therefore, the BLM rolled these costs/benefits into the estimated economic "value" of AUMs presented under the issue above. The formula used to calculate the effects in the issue above accounts for maintenance costs, so those costs are not analyzed separately.

Cultural and paleontological resources

How would project activities affect cultural and paleontological resources?

Cultural and paleontological resources are known to exist in the project area. They could be affected by ground disturbing activities, including restoring or filling in playa dugouts, re-contouring playa dugouts, refurbishing or developing wells, installing pipelines, removing and relocating roads, modifying fences or constructing new fencing, renewing grazing permits and staging for juniper cutting activities. These activities may damage the site surface and subsurface and displace artifacts, or fossils, and the associated cultural or paleontological deposition. This issue was eliminated from further detailed analysis by designing the project to avoid cultural and paleontological resources. Project design features described in Chapter 2 would be included in all action alternatives.

- Cultural and paleontological resources would be managed in accordance with current laws, policy and agreements for the protection of cultural and paleontological resources.

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Appendices

Appendix A, References

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Appendix B, Wildlife seasonal restriction and distance buffers
(page 47 from Upper Deschutes RMP)

Table 1: General Guidelines* for Seasonal Restriction and Distance Buffers

Species	Habitat	Spatial Buffer	Restriction Dates
Bald eagle	Nest	¼ mile non-line of sight ½ mi line of sight 1.0 mile blasting	January 1 – August 31
	Winter Roosts	½ mile	December 1 – April 1
Golden eagle	Nest	¼ to ½ mile	February 1 – August 31
Northern goshawk	Nest	¼ mile	March 1 – August 31
Cooper's hawk	Nest	¼ mile	March 1 – August 31
Sharp-shinned hawk	Nest	¼ mile	March 1 – August 31
Ferruginous hawk	Nest	½ mi direct line of sight ¼ mi with visual buffer	March 1 – August 1
Red-tailed hawk	Nest	¼ mile	March 1 – August 31
Swainson's hawk	Nest	¼ - ½ mile	April 1 – August 31
Peregrine falcon	Nest	1.0 mile	January 1 – August 15
Prairie falcon	Nest	¼ - ½ mile	March 15 – August 15
Osprey	Nest	¼ mile	March 1 – August 31
Burrowing owl	Nest	¼ mile	March 1 – August 31
Flammulated owl	Nest	¼ mile	April 1 – September 30
Great gray owl	Nest	¼ mile	March 1 – July 31
Sage grouse	Lekking	0.6 mile	March 1st – May 15 ** February 15– May 1
	Nesting, Brooding and Rearing	Not applicable (N/A)	April 1 – July 31 *March 15– July 31
	Winter Habitat	N/A	November 15 – March 15 **November 1– March 31
Great blue heron	Nest	660 ft – ¼ mile	15 March – 15 July
Mule deer	Winter Range	N/A	01 December – 30 April **01 November – 01 May
Rocky Mountain elk	Winter Range	N/A	01 December – 30 April **01 December – 01 May
	Calving	N/A	May 15 – Jun 30
Pronghorn	Winter Range	N/A	01 December – 30 April **01 November – 01 April
Townsend's big-eared bat	Hibernaculum	N/A	November 1 – April 15
	Nursery	N/A	April 15 – October 31

*These general guidelines are typical restrictions that could be applied. Specific dates and distances may vary depending on the type of action proposed and the local breeding chronology of species or the local weather patterns.
** Millican Dates

Appendix C, Maps

Maps were posted to the District web site with the original EA in November 2013. The Alternative 3 map originally posted erroneously showed pipelines that were not actually part of the project, so that map has been re-posted along with (but not in) this June 2014 version of the EA. The District web site address is **http://www.blm.gov/or/districts/prineville/plans/index.php**