ALDER CREEK RESTORATION

ENVIRONMENTAL ASSESSMENT
DOI-BLM-OR-B050-2012-0019-EA

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Alder Creek Restoration
Environmental Assessment
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CHAPTER I: INTRODUCTION and PURPOSE AND NEED FOR ACTION

A. Introduction

A 34-acre wet meadow on Alder Creek, in the Upper Malheur Sub-basin, has numerous headcuts (eroding waterfalls) resulting in channel incision (Figure 1). If left, channel incision would continue moving upstream (Wilson, 2011). Where channel incision has occurred, the former floodplain has been abandoned. As a result, the once wet meadow is now a dry upland terrace with a much narrower floodplain adjacent to the stream channel (Figure 2). This wetland is unique in the Three Rivers Resource Area. The nearest wetland of this size and type on BLM managed land is over 41 air miles away.

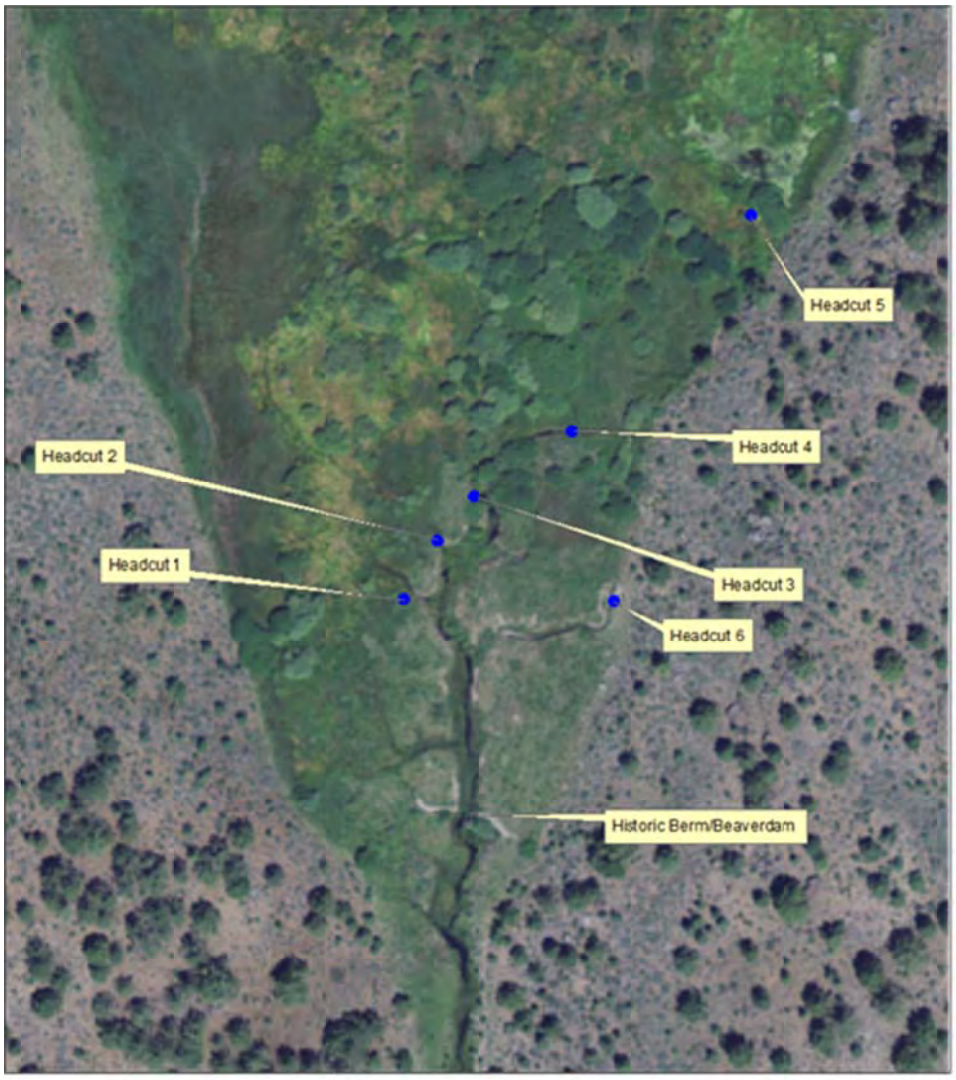

Figure 1. Current headcuts in Alder Creek Wet Meadow.

Upstream of this meadow, there are at least three additional small (1–3 feet deep) headcuts present on Alder Creek. In addition, the surrounding Alder Creek Pasture of Alder Creek Allotment (#05536) is undergoing juniper encroachment to various degrees.

The Burns District Bureau of Land Management (BLM) proposes to implement an ecological restoration project to address the stream channel instability and encroached juniper in this pasture over the next 15 years. The pasture is located in Harney County approximately 6.5 air miles northeast of Crane, Oregon. It is 7,187 acres and ranges from 4,600 to 5,600 feet elevation (Maps A and B, Vicinity and Project Maps). No Wilderness Study Areas (WSA) or Wilderness are present. The project would be broken into two related, but distinct, segments: A) Channel Restoration and B) Juniper Treatment (each with corresponding weed surveys and treatments).

Figure 2. ***Alder Creek, 8/30/2005. Downstream view looking toward the historic berm/beaver dam. Note the narrow riparian zone.***

The BLM acquired much of Alder Creek (including the wet meadow) in a 1985 land exchange. The appraisal report created for the acquisition states the meadow was farmed at one time. An early 20th century plow, still resting at the edge of the meadow, suggests the same. A homestead patent was issued for the wet meadow and surrounding land in 1903 with a water right dated 1897. The remains of a berm/dam running perpendicular to the valley are present at the downstream end of the meadow (Figure 1). Available evidence indicates the headcutting originally started at this berm. Signs of a historic beaver dam are present at the base of the berm. The homesteaders likely built on top of an existing beaver dam, creating a taller berm to impound water. An aerial photo from 1959 does not show headcuts or gullies present; the meadow appeared to be farmed with a functioning dam. However, a 1979 aerial photo shows headcutting had initiated and some gullies had formed. The headcuts presumably initiated when active farming ceased at the site and the dam was no longer maintained. A declining beaver population could also have contributed to dam failure and subsequent headcutting.

Prior to BLM ownership, Alder Creek (upstream of the Wet Meadow) underwent downcutting; resulting in channel lowering of approximately 10–15 feet (Figure 3).

Multiple causes probably contributed to this degradation including historic grazing practices, loss of beaver dams, and flood events. The incised channel is still in disequilibrium as evidenced by a widening floodplain, steep vertical terrace walls, and numerous 1–2 feet deep headcuts lowering the channel bottom.

Two routes access the wet meadow (Map C). Route A, from the north, is entirely through public land. A portion of this route would require removal of impediments (i.e. boulders and juniper) from the roadway to allow equipment to the site. Route B is more intact, but runs primarily through private land (4 miles private, 1.5 miles public). The BLM does not have an easement through this private land. In addition, there are four spring crossings, which would require rock or temporary crossings to be constructed to make Route B passable for construction equipment.

The proposed Project Area is within the Alder Creek Pasture of the Alder Creek Allotment (#05536). Current livestock grazing management is designed to improve riparian conditions and is achieving the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Oregon and Washington BLM. This Environmental Assessment (EA) does not propose to permanently change livestock grazing management. This pasture is currently grazed every other year from mid-May to late-June. Regardless of the decision following this EA, livestock would be managed in compliance with the 1997 Alder Creek Allotment Management Plan as a term and condition of the current livestock grazing permits.

1. Purpose and Need for Action

The purpose of the Alder Creek Restoration is to prevent loss of wetland habitat and to improve water quality and riparian and fisheries habitat within Alder Creek Pasture of Alder Creek Allotment. The need for action is based on loss of wetland meadow and channel instability along Alder Creek. The outward expression of this channel instability is evidenced by:

- Headcuts and gullies present at the lower end of the Alder Creek Wet Meadow (Figure 1).
- Additional small (1–3 feet) headcuts along Alder Creek upstream of the Wet Meadow.
- Excess sediment within the channel.

To retain the existing wet meadow and prevent further degradation of Alder Creek, there is a need to actively stabilize the existing headcuts.

The Three Rivers Resource Management Plan (RMP), September 1992, goals and objectives state:

- Water Quality (WQ) 1.1: “Improve surface water quality on public lands to meet or exceed quality requirements for all beneficial uses consistent with [Department of Environmental Quality] DEQ...” Chapter 2, page 4.

- WQ 1.12: “Implement streambank stabilization projects on streams…, especially where healing has not occurred within 5 years of a change in the grazing system or livestock removal.” Chapter 2, page 10.

- Soil Management (SM) 2.1: “Rehabilitate headcuts… where modifications of management practices alone do not facilitate stabilization of erosion concerns.” Chapter 2, Page 20. Table 2.2: Headcut and Gully Control Methods.

- Forestry (F) 2.1: Remove or thin selected concentrations of western juniper which adversely affect rangeland, watershed, wildlife habitat or other management objectives…” Chapter 2, page 24.

- Vegetation (V) 1: “Maintain, restore or enhance the diversity of plant communities and plant species in abundances and distributions, which prevent the loss of specific native plant community types or indigenous plant species within the RA.” Chapter 2, page 51.

- Special Status Species (SSS) 2.6: “Implement streambank stabilization projects on streams which have redband trout … habitat and which have less than 90 percent stable streambanks.” Chapter 2, page 59.

Chapter III (Affected Environment) presents the baseline environmental conditions and a more detailed description of relevant resource components of the proposed project area.

2. Decision to be Made

The BLM Field Manager will decide whether or not to approve all or a portion of the following within Alder Creek Pasture: in-stream structures, fences, weed treatments, and juniper treatments.

B. Conformance with Land Use Plans

The Proposed Action and alternative are in conformance with the Three Rivers Resource Management Plan (RMP)/Record of Decision (ROD) (September 1992), even though they are not specifically provided for, because they are clearly consistent with the goals and objectives outlined under the Purpose and Need in Chapter 1.A above.

C. Consistency with Laws, Regulations, and Policies

The Proposed Action and Alternatives described below are in conformance with the following documents, which direct and provide the framework for management of BLM lands within Burns District:

- National Environment Policy Act (NEPA) (42 United States Code [U.S.C.] 4321-4347), 1970,
- Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1701), 1976,
- Three Rivers RMP, ROD, and Rangeland Program Summary,1992,
- Burns District Noxious Weed Management Program EA/Decision Record (OR-020-98-05), 1998,
- Greater Sage-Grouse and Sagebrush-Steppe Ecosystems Management Guidelines, BLM-2000,
- BLM National Sage-Grouse Habitat Conservation Strategy, 2004,
- Greater Sage-Grouse Conservation Assessment and Strategy for Oregon, August 2005,
- State, local, and Tribal laws, regulations, and land use plans,
- Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States ROD, 2007,
- Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD, 2010,
- BLM Roads Manual (Internal) - 9113, Release: 9-390 and 2011 BLM Primitive Roads Manual - 9115, Release: 9-391, 2012,
- Incorporating Road Best Management Practices, Instruction Memorandum (IM)-OR-2011-074,
- Migratory Bird Treaty Act (16 U.S.C.703–711), 1918,
- Endangered Species Act (16 U.S.C. 1531–1544), 1973,
- Clean Water Act (33 U.S.C. 1251-1387),
- Clean Air Act (42 U.S.C. 7401 et seq.), 1970,
- National Historic Preservation Act of 1966 As Amended (16 USC 470 et seq.),
- American Indian Religious Freedom Act, as amended, (42 USC 1996 and 1996a),
- Executive Order No. 13007, Indian Sacred Sites (1996),
- Native American Graves Protection and Repatriation Act of 1990, as amended (25 USC 3001 et seq.),
- *and* Conducting Wilderness Characteristics Inventory on BLM Lands - 6310 (BLM Manual 6-129).

The Proposed Action has also been designed to be consistent to the following document:

Malheur River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP), September 2010.

- 2.2 Designated Beneficial Uses: “Fish and aquatic life is considered one of the most sensitive beneficial uses in the basin.” page 2-3.

- 4.5 Temperature: “The Malheur River and several of its tributaries are listed as water-quality limited for temperature on the 303(d)…Most of these streams are classified as Redband Trout habitat with a seven-day-average maximum temperature standard of 20 degrees Celsius (68.0 degrees Fahrenheit).” pages 4-19.

- Chapter 6 Water Quality Restoration Plan (WQRP) Implementation, Alder Creek: “Stabilize the existing headcut complex at the lower end of the Alder Creek Wet Meadow.” page 103.

D. Scoping and Identification of Issues

The BLM conducted internal scoping both with interdisciplinary team (IDT) meetings on 1/10/2012 and 3/05/2013 and with informal discussions with various specialists within the BLM concerning the project. The BLM also conducted a meeting with Tony Rutherford, the former water master, on 11/01/2012 and an on-site meeting with the Nature Conservancy on 10/09/2012. In addition, the BLM mailed eight scoping letters on January 20, 2012 and December 31, 2012 to the following: Harney County Courthouse, Oregon Natural Desert Association-Portland, Oregon Natural Desert Association-Bend, Allotment Permittee, Second Oregon LLC (permittee), Burns Paiute Tribe, Harney Soil and Water Conservation District, and the Oregon Department of Fish and Wildlife. The BLM received three comment letters back. The issues identified in those letters received, along with issues identified during IDT meetings and through contact with other agencies, have been addressed by the BLM IDT.

1. Issues for Analysis

The following issues were raised by the public or BLM staff, or both, and are considered in this EA.

- The BLM should consider an alternative without the use of tracked vehicles that would eliminate the need for surface disturbance along the access route.

  Issue addressed in Chapter II.C. Alternatives Considered but Eliminated from Further Analysis.

- Alternatives involving tracked vehicles should include requirements that continuous blading would be avoided, removal of boulders would only occur where necessary, and any other surface disturbance along the routes be limited to only those activities necessary for safe passage of project equipment

  Issue addressed in Chapter II.B. Headcut Restoration - Equipment Access.

- Project design should explicitly state that BLM would maintain the primitive and unmaintained nature of the route and would not, through project activities, upgrade the maintenance level or character of the route.

  Issue addressed in Chapter II.B. Headcut Restoration - Equipment Access.

- BLM should describe in detail the time period when the project would be accomplished.

  Issue addressed in Chapter II.B. Headcut Restoration - Construction.

- The project design should include monitoring and documentation of project activities including maps and pre- and post-work photographs of route conditions.

  Issue addressed in Chapter II.B. Project Design Elements.

- The BLM should explicitly state, in all alternatives, that no juniper with old growth characteristics would be cut.

  Issue addressed in Chapter II. B. Project Design Elements.

- Any alternative should include rest from grazing. Multiple seasons of rest or the installation of a riparian/wet meadow exclosure, as well as an assessment of whether current grazing levels can be sustained post rest period should be considered.

  Issue addressed in Chapter II.B. Livestock Grazing - Rest.

- The Cultural and Heritage Department of the Burns Paiute Tribe should be contacted immediately if any known or suspected cultural resources are encountered during any phase of the work.

  Issue addressed in Chapter II.B. Project Design Elements.

- The Burns Paiute Tribe is concerned about the general decimation of old growth juniper trees which are considered sacred.

  Issue addressed in Chapter II. B. Project Design Elements.

- Please address the underlying contributing cause of downcutting, including livestock grazing.

  Issue addressed in Chapter I.A.1 - Purpose and Need for Action.

- Could restoration be accomplished without heavy equipment? What if material was helicoptered in, and hand crews (or even draft animals) were used to place the logs and check dams?

  Issue addressed in Chapter II.C.4 - In-stream restoration without use of heavy machinery.

- If the food supply would support a population, we urge the BLM to bring beaver back into the area.

  Issue addressed in Chapter II.C.1 - Augmenting the existing beaver population.

- Please retain some larger live juniper and dead juniper on site for structural habitat values and nutrient retention.

  Issue addressed in Chapter II. B. Project Design Elements.

- Juniper could be used in the headcut repair effort.

  Issue addressed in Chapter II. B. Headcut Restoration - Construction.

- Detailed information on the amount and location of Phase II and Phase III juniper that would be cut and piled should be included.

  Issue addressed in Chapter II.B. Juniper Treatments.

2. Issues Considered but Eliminated from Detailed Analysis

The following issues were raised by the public or BLM IDT during scoping and internal reviews for the project. These issues have been considered but eliminated from detailed analysis because they are outside the scope of this analysis or do not relate to how the Proposed Action or alternative respond to the purpose and need.

a. Lands with Wilderness Characteristics

The proposed Project Area lies within Tin Can Ridge Citizen Proposed Wilderness Study Area (PWSA) submitted in September 2007.

An intensive inventory for wilderness characteristics occurred in this area in 1979. The Wilderness Review Intensive Inventory Final Decision of March 1980 determined to eliminate all subunits (including subunit C, in which the current proposed Project Area lays) of the Coleman Creek Unit from further wilderness review. These subunits were eliminated because they did not offer outstanding opportunities for solitude or primitive and unconfined types of recreation; they appear to be in a basically natural condition.

The land ownership of subunit C of the Coleman Creek Unit has changed since the 1980 Intensive Inventory. A Wilderness Inventory Maintenance (WIM) assessment was completed in 2008 by a BLM IDT of BLM's Tin Can Ridge WIM Unit. This WIM unit encompasses the proposed Project Area. This WIM Unit lies within the Tin Can Ridge PWSA and this entire proposed Project Area. The IDT used current field data along with the citizens' PWSA data and determined there is no wilderness character present in the Tin Can Ridge WIM Unit and this proposed Project Area. The WIM unit met the size criteria, but did not meet naturalness criteria because the large expanses of cut trees in the juniper treatment areas (1,776 acres) are easily seen by visitors. The unit was inventoried again in 2013 and the conditions noted in the 2008 inventory were still present. The juniper treatments are un-natural in appearance.

On February 21, 2013, the BLM received a letter from the Oregon Natural Desert Association (ONDA). The ONDA stated their concerns about the possible upgrades to the access route into the Alder Creek area of the Tin Can Ridge WIM unit. The unit was inventoried for wilderness characteristics in 1979 and in 2010, and as a result of the recent letter from ONDA, again in 2013.

Conditions present during the 2010 inventory were found to be still in existence at the time of the 2013 evaluation. Juniper treatments throughout the unit are noticeable and un-natural in appearance.

b. Greenhouse Gas Emissions and Climate Change

Changes in greenhouse gas levels affect global climate. Forster (2007) reviewed scientific information on greenhouse gas emissions and climate change and concluded human-caused increases in greenhouse gas emissions are extremely likely to have exerted a substantial warming effect on global climate. The U.S. Geological Survey, in a May 14, 2008 memorandum to the U.S. Fish and Wildlife Service (USFWS), summarized the latest science on greenhouse gas emissions and concluded it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location. This memorandum

is incorporated here by reference. Greenhouse gas emissions resulting from implementing either the Proposed Action or No Action alternative would vary, depending on the number of acres treated in a given year or acres burned in a wildfire, should one occur. Table 1 summarizes the amount of emissions estimated to be produced per acre by implementing the project or by a wildfire occurring. Greenhouse gas emissions from the Proposed Action would be undetectable. The Proposed Action would result in greenhouse gas emissions constituting a fraction of current total global emissions of 25 billion tons of carbon dioxide (Denman et al., 2007) and current total U.S. emissions of 5.2 billion tons of carbon dioxide (Environmental Protection Agency [EPA], 2012). This emission would be so small that its incremental contribution to global and national emissions would not be measurable at the level of precision of the global and national emissions.

Table 1: Comparison of the estimated emissions outputs in pounds/acre from the No Action Alternative and the treatments outlined in the Proposed Action.

	Wildfire (No Action)	Machine Pile Burning	Hand Pile Burning
PM (Particulate Matter)	.41	.12	.06
PM 10 (PM - 10 Microns)	.29	.08	.04
PM2.5 (PM - 2.5 Microns)	.27	.07	.04
CO (Carbon Monoxide)	2.26	.41	.21
CO2 (Carbon Dioxide)	41.75	8.99	4.51
CO4 (Methane)	.10	.03	.02
NMHC (Non-Methane Hydrocarbons)	.08	.02	.01
Total Emissions	45.16	9.72	4.89

Note: The table represents the estimated emissions produced per acre burned under three scenarios; Alternative I, No Action= August Wildfire and Alternative II, Machine and/or Hand Piling. The table assumes approximately 50 percent of conifer canopy consumed by wildfire and cut junipers being piled at a low rate of approximately 6 tons per acre by hand to approximately 12 tons per acre by machine. Source: CONSUME and Piled Fuels Biomass and Emissions Calculator

c. Additional Issues (1) - (12)

(1) The BLM should include a minimum tool and restoration analysis that would limit and restore disturbance along the routes used to access the site.

Response: The Project Area was analyzed for wilderness characteristics in 1979 and 2009. Both analyses determined the area did not contain wilderness characteristics (see Chapter I.D.2.a). The Minimum Tool and Restoration Analysis are required for areas designated as Wilderness or Wilderness Study Areas; because the Project Area does not contain Wilderness Characteristics, this analysis tool is not necessary.

(2) The natural appearance of the area should be protected by ensuring all disturbances are restored as vehicles leave the area, including the replacement of all boulders or other obstacles.

Response: The proposed equipment access route follows roads designated as either Maintenance Intensity (MI) 1 or 3. The intent of road work would be to allow for access of necessary equipment to the project site. However, the BLM would also need to access the site on later dates to monitor the watershed restoration project and provide structure maintenance as needed to ensure headcut restoration, stream channel stabilization, and wet meadow conditions continue to meet planned resource objectives. Road maintenance would be for the purpose of providing access to the project site, would be in accordance with the assigned MI, and would be completed in a manner to minimize disturbance, conform with topography, and restore or minimize disruption of natural drainage patterns as needed to protect adjacent lands and resource values while ensuring safe vehicle passage for monitoring and resource management activities. Best Management Practices (BMP) would be implemented to minimize potential negative impacts, while facilitating multiple-use resource management.

Replacing objects, such as boulders, in the roadway is outside the scope of the purpose and need for this document and would not be consistent with resource management objectives.

(3) Project design should incorporate provisions to prevent additional recreation or other use of the route during the period of time when boulders and juniper have been removed from the route. One means of accomplishing this would be replacement of some obstacles behind the equipment as it accesses the site.

Response: Access roads are identified as MI 1or 3. The area is not in a Wilderness or a Wilderness Study Area; nor does it have Wilderness Characteristics. Limiting or restricting public access or administrative access on the access roads is outside the scope of the purpose and need for this document.

(4) The BLM should specifically limit the number of vehicle trips along the access route as well as the period of time before all surface disturbances along the route must be restored.

Response: Same answer as (3) above.

(5) BLM should provide a clear commitment that burning would not require additional disturbance along the access route to accommodate vehicles.

Response: Road maintenance expected for this project includes moving impediments to travel necessary for tracked vehicles to access the site. However, because the access routes are designated as MI 1 or 3, future maintenance along these routes is expected to occur at some point in time. Limiting or restricting public access or administrative access on the access roads is outside the scope of the purpose and need for this document.

(6) The BLM should consider and analyze the use of only native seed mix.

Response: There are noxious weed infestations surrounding the Alder Creek Pasture with several sites found within the pasture. The low survival for native seed in ecological sites supporting Wyoming big sagebrush steppe communities are at risk to invasive annual grasses (James et al. 2011; Davies et al. 2011). Only seeding native species in these sites puts them at risk for annual grass invasion. However, non-native species have shown to be competitive with invasive annual grasses. Asay et al. (2001) found on Wyoming big sagebrush sites with a high threat of invasion from exotic annual grasses, using non-native species can be a practical re-vegetation option. Davies et al. (2010) and Monaco et al. (2003) found the spread of invasive plants such as cheatgrass and medusahead can be reduced by establishing competitive non-native vegetation adjacent to or in infested areas. Using only native seed to re-vegetate disturbed areas puts those areas at higher risk for annual grass invasion. This would not meet the purpose and need and therefore will not be analyzed.

(7) BLM should be aware of Oregon State laws concerning cultural resources.

Response: Various Oregon State statutes are cited throughout the comment letters. We are not subject to Oregon cultural resources statutes on Federal land. We are guided by Federal law and regulations. See *Chapter II. B. Project Design Elements.*

(8) BLM staff is required to have an Archaeological Resources Protection Act (ARPA) permit to excavate cultural sites on Federal land.

Response: The BLM does not require a permit as long as we meet the qualifications, experience, and conditions laid out in 43 CFR 7.8 and 7.9. The BLM Fuels and District Archaeologists meet or exceed the Secretary of Interior's standards as professional Archaeologists. The BLM Archaeologists have the qualifications to undertake scientific excavation of cultural resources sites on BLM lands.

(9) There are concerns about the potential of the discovery of human remains, funerary objects, sacred objects, and objects of cultural patrimony.

Response: The BLM is guided by the Native American Graves and Repatriation Act of 1990 and its regulations if such a discovery is made. Burns District BLM policy is to immediately stop work on whatever activity has exposed the remains. Human remains would then be reported to the Oregon State Police. If the State of Oregon authorities determine the remains are not modern, the BLM would notify the nearest recognized Indian Tribe (and other tribes if the burial is found in their aboriginal territory). See *Chapter II.B.4 - General Project Design Elements*

(10) There are concerns about locked gates preventing public access on roads in and around Alder Creek.

Response: Route B, as described in Chapter I.A - Introduction, is primarily on private land and does not have a public easement. This route could be locked by the private landowners. However, Route A is entirely on public land. Gates on this route should not be locked because the route runs entirely across public land. If there are locked gates, BLM law enforcement would remove signs and re-open gates.

(11) Would the road improvements increase [Off-Highway Vehicle] OHV activity? What if OHVs get access to the meadow?

Response: Road maintenance would not increase OHV activity. OHVs currently have access to the meadow. This use is primarily evidenced during the hunting season from BLM encounters with OHVs and visible road usage. Road maintenance would not change the MI (1 or 3) of the access roads. The purpose of the road work would be to allow necessary equipment (i.e. tracked vehicles) to access the site. The intent of the maintenance would not be for improving access for OHVs or other 4x4 vehicles.

(12) Are there existing or potential erosion problems along the existing or proposed roads? There is a concern that access roads cross several water courses.

Response: No new roads are proposed for development. Maintaining the existing road network leading to the Project Area to address erosion is outside the scope of this document. The only watercourse crossed by equipment is Alder Creek at the project site. Rehabilitation of the stream crossing is included in the Proposed Action (see Chapter II. C. Headcut Restoration - Construction).

CHAPTER II: PROPOSED ACTION AND ALTERNATIVES

Alternatives I - No Action and II - Proposed Action have been fully analyzed in Chapter III of this EA. Following the public review period for this document a proposed decision would be issued by the Field Manager. The Field Manager may choose to proceed with one alternative or portions of each of the alternatives analyzed.

A. Alternative I - No Action

The No Action Alternative would include continued water quality and riparian condition monitoring of the Alder Creek system. No action would be taken to stabilize the headcuts at the lower end of Alder Creek meadow and throughout the system. In-stream structures, fences, and juniper treatments would not be completed. Weed treatments would continue using the four approved herbicide active ingredients: 2, 4-D, dicamba, picloram, and glyphosate.

B. Alternative II - Proposed Action: Headcut Restoration, Juniper Treatments, and Weed Treatments

The Proposed Action was designed by a BLM IDT. It would stabilize and restore the multi-branched headcut within Alder Creek meadow as well as other headcuts within Alder Creek Pasture of Alder Creek Allotment (#05536). It also treats encroached juniper

within the Alder Creek Pasture (Map B). The following project design elements (PDE) would be implemented:

General PDEs (general/weed treatments/access)

- Proposed restoration sites/access road/juniper and weed treatment sites would be surveyed for cultural resource values prior to implementation. Where cultural sites are found, their condition and National Register eligibility would be evaluated. If determined National Register eligible and under threat of damage, mitigation measures to protect cultural materials would be determined. Mitigation plans would be developed in consultation with the State Historic Preservation Office. Mitigation measures can include protective fencing, avoidance, surface collection and mapping of artifacts, subsurface testing and complete data recovery (full-scale excavation).

- If cultural material is encountered during ground disturbing activity, the contractor would stop work in the area and notify the District Archaeologist or, if absent, one of the other members of the cultural staff at the Burns District Office. Once the District Archaeologist or his representative has inspected the discovery; the Cultural and Heritage Department of the Burns Paiute Tribe would be notified. After consultation with the Tribe has occurred, the BLM official would make the decision to resume the project, modify it to avoid a cultural find, or devise another means to mitigate an adverse effect to a National Register eligible site.

- If Human Remains are discovered, a stop work order would immediately be issued for whatever activity exposed the remains. Human remains would then be reported to the Oregon State Police. If the State of Oregon authorities determine the remains are not modern, the BLM would notify the nearest recognized Indian Tribe (and other tribes if the burial is found in their aboriginal territory).

- Proposed restoration sites/access road/juniper and weed treatment sites would be surveyed for Special Status plant species prior to implementation. If Special Status Plants are found, site(s) where they are located would become avoidance areas.

- Proposed restoration sites/access road/juniper and weed treatment sites would be surveyed for Special Status wildlife species prior to implementation. If special status wildlife species are found, mitigating measures, if necessary, will be employed to eliminate or minimize effects or disturbances.

- The grazing permittees would be responsible for all fence maintenance under a cooperative rangeland management agreement. Proper fence maintenance would be a stipulation for turnout each year. All proposed fences would be constructed using BLM approved standards for 4-strand wire fences.

- Proposed restoration sites/access road/juniper and weed treatment sites would be surveyed for noxious weed populations prior to implementation.

- Reseeding may take place in sites/access road/juniper and weed treatment sites disturbed by implementation of restoration (including herbicide treatments); this would involve hand seeding and planting. All seed mixes would be determined by an IDT and would meet BLM requirements.

- Monitoring would be conducted by BLM staff in coordination with interested parties.

  Structures: For the first five years following headcut restoration activities, structures would be checked annually following spring run-off to determine if maintenance on structures or fence exclosures is needed. If the structures are stable after five years, the structures would be monitored on high-water years after spring flows and during normal allotment inspections. Photo points have been established and would be re-taken on 2 to 5 year intervals for 20 years dependent upon funding. Necessary fence maintenance would be performed by livestock grazing permittees prior to livestock turnout each year.

  Plantings: Plantings would be monitored annually in the summer for five years. If mortality of plantings exceeds 50 percent in the first five years and natural regeneration does not take place, woody species would be re-planted.

  Access Routes: Photos would be taken to document route conditions before and after project activities to determine impacts to the access route.

Construction Activity PDEs

- Staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc.) would be outside the 100-year floodplain in a location and manner precluding erosion into or contamination of the stream or floodplain. They would have botanical, wildlife, and archeological clearances prior to use.

- All equipment would be cleaned and be free of mud, plant material, and seeds to reduce the likelihood of noxious weed introductions. It would also have leaks repaired prior to entering the Project Area. External oil and grease, along with dirt and mud, would be removed prior to construction. Thereafter, equipment would be inspected for leaks or accumulations of grease, and identified problems fixed before entering streams or floodplains.

- Equipment used for in-stream or riparian work would be fueled and serviced in the established staging area outside the riparian zone. When not in use, equipment would be stored in the staging area and would use drip pans as necessary to minimize soil contamination from leaks.

- Emergency spill containment equipment would be available at all times to manage petroleum product spills or leaks; if a spill or leak occurs, it would be cleaned up immediately and appropriate officials would be notified.

- If a hazardous material spill or pollution event occurs (including but not limited to a fuel spill), it would be evaluated by the BLM and appropriate officials would be notified.

- BLM cultural resources staff would monitor excavation activities for cultural resources. If site(s) were found, appropriate mitigation, formulated by the District or Fuels Archeologist, would be implemented to minimize disruption to archeological sites.

- Where possible, all work areas would be isolated from the active stream flow. Native material and plastic sheeting, or other approved methods, would be placed on undisturbed streambed to confine flow, provide fish passage, and isolate the construction areas. If necessary, fish salvage would be conducted.

Juniper Treatment PDEs

- No juniper with "old growth" characteristics, cavity nest, or raptor nest would be cut. Old growth juniper is defined as a juniper tree possessing most of these characteristics: a rounded top, large dead limbs, deeply furrowed bark, deeply dissected trunk, large lower limbs, and yellow lichen on branches.

- All burning would be coordinated with the Oregon Department of Forestry (ODF) by following the Smoke Management Forecast and Instructions as issued by the Salem Forestry Weather Center. These instructions are available daily at: http://oregon.gov/ODF/FIRE/fire.shtml/#Smoke_Management_Information

- Slash pile burning would be planned for implementation when atmospheric conditions promote good smoke dispersion into the atmosphere. These conditions are highly variable, and include adequate mixing height, transport wind speed, and wind direction. These specific conditions are outlined in the daily Oregon Smoke Management Instructions, which will be adhered to for any burning.

The proposed management actions are described in detail as follows:

1. Headcut Restoration

Headcut restoration plans have been designed by Engineers at the Grant County Soil and Water Conservation District (GCSWCD). The GCSWCD Engineers have experience working in similar aquatic systems in the neighboring Blue Mountains Eco-region. Appendix B contains the detailed project design. This design would recreate the conditions which initially created the wet meadow; this would be

done by installing a series of rock and earthen check structures leading to the historic berm/beaver dam site. An impervious moisture barrier would be placed under the check structures to prevent flow escapement due to percolation. Upstream and downstream movement of juvenile and adult fish would not be blocked by the structures. A pool would be created above the uppermost check structure in the incised channel. A series of log structures would be placed within this pool to provide fish habitat and cover. The log structures would start the natural process of trapping and replacing sediment removed by the headcutting. Live willows and cottonwoods would be planted along the incised channel, for approximately ¼ mile, to provide shade and additional cover habitat. This material would be collected locally where possible, or brought in from similar locations. Planted trees would be protected from beaver using either mesh fencing, tree shelters, paint mixed with sand, or a combination of these methods. Newly planted Sedge mats or woody plants would be salvaged from construction activities where possible and used post construction to help rehabilitate disturbed areas. The new channel is designed to sustain a 100+ year flood event.

EQUIPMENT ACCESS

Vehicles and project equipment (4X4 vehicles, fuel truck, all-terrain vehicles [ATV], two tracked excavators, and one tracked off-road dump truck) required for the project would access Alder Creek via Route A (Map C). The route begins at Highway 20 and extends south on the Stinkingwater Access Road (MI 3; which allows for a maintenance level sufficient to generally keep the route in use for the majority of the year) then east on the Warm Springs-Stinkingwater Access Road (MI 3) to Alder Creek Road (MI 1; where route surface and other physical features are not maintained for regular traffic). The route then extends south on Alder Creek Road (MI 1), and east on Alder Creek Spur Road (MI 1).

To allow heavy equipment access to the site, the tracked excavator used for the project would move intermittently located impediments to travel (e.g. boulders, juniper) from the existing roadway as it travels to the project site. No more than one cumulative mile of this type of work is expected. This would allow project equipment access to the site. No continuous road surface blading is planned. Removal of boulders and juniper would only occur where necessary. Surface disturbance along the access routes would be limited to activities necessary for ensuring safe passage of project equipment and personnel. Planned work would not alter the MI Levels of the access roads; there would be no new road construction, no road realignment, nor any upgrading of route categories of roads.

CONSTRUCTION

Construction would require one or two tracked excavators and one tracked off-road dump truck. Rock, soil, and juniper (with rootwads attached) needed for in-stream structures would be collected near the wet meadow to reduce road usage and costs and to avoid introduction of weeds from outside sources. Approximately 140 cubic yards of large rock, with a target diameter of 18” to 24”, would be collected with the excavator and dump truck from the surrounding hillsides.

Collection sites would be re-sloped and re-vegetated, with a seed mix consisting of crested wheat grass, bluebunch wheat grass, sheep fescue, and bottlebrush squirreltail, to appear aesthetically natural and would blend in with the surrounding hillside.

The 340 cubic yards of fine-grained soil (i.e. silt, sand, clay) needed for the in-stream structures would be collected from vertical streambanks upstream of the wet meadow. Above the wet meadow, Alder Creek has incised approximately 10 feet deep. Alder Creek is in the process of forming a wider floodplain at this lower elevation. Because of this, there are places where the stream flows adjacent to unstable and eroding banks (Figure 3). The 340 cubic yards of soil needed would be collected from these vertical banks. Where soil is collected, the bank would be re-shaped to reduce the bank angle to a 2:1 to 4:1 slope (Figure 4). On many of the abandoned terraces, mature willow plants still persist. If these willow clumps are present on banks being sloped, they would be salvaged where feasible, and used to re-vegetate the newly sloped banks and/or used at the headcut restoration site(s). The toe of the newly sloped banks would be planted with willow and/or cottonwood. Above the bankfull level, upland grass species would be seeded. The seed mix would consist of crested wheatgrass, bluebunch wheat grass, sheep fescue, and bottlebrush squirreltail. Additional bank sloping/contouring to stabilize vertical banks could occur at a later date if/when funding allows.

Figure 3. *Example of vertical streambank along Alder Creek. This would be a typical site where banks would be sloped to collect needed soil for the headcut restoration.*

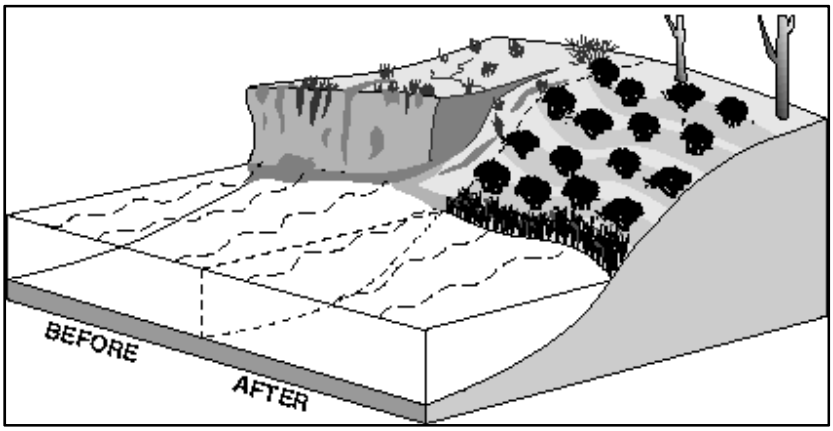

Figure 4. *Before and after diagram depicting what bank sloping restoration is (taken from Federal Interagency Stream Restoration Working Group [FISRWG] 1998).*

Juniper surrounding the wet meadow would be utilized for the log structures. Juniper used would be approximately 14” to18” in diameter with roots and limbs attached. Disturbance from juniper collection would also be re-seeded with a seed mix consisting of crested wheatgrass, bluebunch wheatgrass, sheep fescue, and bottlebrush squirreltail.

All construction activities would occur during the in-water work period for fish bearing streams and would avoid the Spotted Frog breeding season, October 1–February 28. It is expected weather would limit work to October 1–November 15. Project activities are expected to take approximately two to three weeks. Permits from the Army Corps of Engineers and the Oregon Department of State Lands would be obtained prior to construction activities.

Wet meadow crossings by equipment (excavator and dump truck) would be kept to a minimum over the two to three week period. To minimize impact, the equipment to be used would be tracked instead of rubber tired. There would be one temporary stream crossing constructed for the equipment to access the site. This crossing would be rehabilitated to return the site to conditions similar to those prior to construction. The beaver pond or dams may need to be temporarily breached during the construction period to allow equipment passage across the wet meadow. Equipment would also cross the stream where the in-stream work would occur (Map B). The road along the west side of the meadow would be used to haul fill from the vertical banks along the upstream portion of Alder Creek to the in-stream structure site on the south end of the wet meadow.

Structure maintenance would be necessary if boulders or log structures move and cause channel instability. Structure maintenance would occur prior to the next year’s spring run-off, dependent upon weather and funding. The use of a tracked excavator would be expected for maintenance. Work would occur during the in-

stream work window identified above. Access to the site (route and methods) would be the same used under the Proposed Action (Route A). The maintenance would occur for the life of the structures, but would mostly likely be needed within the first three years of construction. After three years, vegetation should be well established which would aid in structure stability.

LIVESTOCK GRAZING REST

To keep livestock off of newly created structures, a 4-strand exclosure fence would be built around the meadow (approximately 100 acres), by the Bureau of Land Management. Fence maintenance would be the responsibility of the Livestock Permit Holder (Permittee) as outlined in a rangeland improvement agreement.

To facilitate rest two cattle guards would be installed, one at the gate between Mountain Pasture and Alder Creek Pasture and one between Mountain Allotment and Alder Creek Allotment's Mountain Pasture. This would alleviate problems with cattle in adjacent pastures accessing the project site from gates being left open.

SMALL HEADCUT RESTORATION

Where small headcuts (less than three feet high) exist outside of the meadow, rock or juniper grade control structures, called cross vanes ,would be installed downstream of the headcut. Work would occur using either tracked excavator or by hand where feasible. These structures would be similar in design to the ones proposed for the Alder Creek Meadow. These headcuts are much smaller than the ones in Alder Creek Meadow and it is anticipated only one or two grade control structures would be necessary per headcut.

2. Juniper Treatments

Encroached juniper within Alder Creek Pasture would be cut and piled or girdled. The primary treatment type would be clear cutting, leaving only old growth juniper or trees with cavities or raptor nests, followed by hand or excavator piling of slash. Excavator piling of old juniper cut and leave treatments would also occur where slope or terrain allows excavator access. Chainsaws would be used to cut encroaching juniper. Machine piles would generally be 8–12 feet tall by 16–22 feet wide and would be constructed of previously cut juniper using grapple equipped excavators in dry or frozen conditions. Hand piles would be constructed of bucked up slash on ground where machine piles cannot be constructed due to excessive slope (25 percent–40 percent slope) or other resource concerns. Hand piles are generally 3–5 feet tall by 3–5 feet wide.

Cutting of juniper displaying most old growth characteristics or containing cavity or raptor nest, as described in Chapter 1 B. 4 - Project Design Elements, would be avoided. Designation of woodland harvest areas would be considered yearly, on a site-by-site basis. Piles would be burned after adequate cure time, usually within

1–2 years. Piles would be burned during late fall, winter, or spring. Protection of old growth juniper during all operations would be considered under the constraints of human safety. Pile burning would follow the Oregon State Smoke Management Plan in order to protect air quality and reduce health and visibility impacts on designated areas. Piles would be burned when they have cured, and soil is frozen or moist to prevent fire spread. Burned areas would be seeded with a seed mix consisting of crested wheat grass, bluebunch wheatgrass, bottlebrush squirreltail, and sheep fescue. This pasture is 7,187 acres of which all 7,187 acres could eventually be treated, dependent upon funding. However, treatments in riparian corridors, Douglas-fir (*Pseudotsuga menziesii*), aspen (*Populus tremuloides*), bitterbrush (*Purshia tridentate*), and mountain mahogany (*Cercocarpus ledifolius*) stands would be completed first, dependent on funding and personnel availability.

3. Weed Treatments

Restoration activities within the project boundary would be surveyed for noxious weeds before and for at least two years after project activities. Weeds found would be treated using the most appropriate methods. Where herbicide application is determined to be the most appropriate treatment for noxious weeds, use of herbicides would be in conformance with label instructions. Only treatments allowable on Oregon BLM lands in conformance with standard operating procedures (SOP) and mitigation measures would be used. Herbicides would be applied aerially or using ground-based sprayers. In addition to our suite of products analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05), supplementary herbicides to be used to treat noxious weeds include:

a. Imazapic (Plateau) at 6 oz./acre (0.178 lbs./acre of active ingredient Imazapic) applied in the fall to treat medusahead rye, ventanata, and cheatgrass. Application method would be by either low boom or aerial spray. Aerial spray treatments for medusahead rye would be used on upland infestations 100 acres or greater and/or on smaller infestations which ground equipment cannot access.

b. Chlorsulfuron (Telar XP) at 1.3 oz./acre (0.061 lbs./acre of active ingredient Chlorsulfuron) applied during the growing season to treat mustards and thistles. Application method would be using ground equipment with either low boom or spot spraying.

c. Clopyralid (Transline) at 1.33 pint/acre (0.5 lbs./acre of active ingredient Clopyralid) mixed with either:
   (1) 2,4D at 1 qt./acre (0.95 lbs./acre of active ingredient 2,4D) to treat Canada thistle and knapweed during the bud to bloom stage, or
   (2) Chlorsulfuron at 1.3 oz./acre applied during the growing season to treat Canada thistle and knapweeds.

Application method would be using ground equipment with either low boom or spot spraying.

Application of Imazapic would occur from late summer–early fall to reduce impacts to the establishment and survival of seeded species. The risk of noxious weed introduction in the Project Area would be minimized by ensuring all equipment (including all heavy equipment, ATVs, 4X4 pickup trucks) is cleaned prior to entry to the sites, minimizing disturbance activities, and completing follow-up monitoring to ensure no new noxious weed establishment. Should noxious weeds be found, appropriate control treatments would be performed in conformance with the 1998 Burns District Noxious Weed Program Management EA/DR (OR-020-98-05) (or subsequent Weed Management documents) and Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD (October 2010).

C. Alternatives Considered but Eliminated from Detailed Analysis

1. Augmenting the Existing Beaver (*Castor canadensis*) Population

This alternative would utilize beaver as a tool for restoring/stabilizing the headcuts along Alder Creek, by supplementing beaver into the system. The capability of beavers to store water, trap sediment, reduce erosion, and enhance riparian vegetation has been well documented (Pollock et al., 2003; Rosell et al., 2005; Muller-Schwarze and Sun, 2003). Old and current beaver sign is present within the meadow. A permit from Oregon Department of Fish and Wildlife (ODFW) would be required to relocate a beaver colony from another location within Harney County to the upper reaches of Alder Creek. While beaver have been used as a tool for riparian restoration elsewhere, this alternative was eliminated from detailed analysis for the following reasons:

a. The BLM would need to obtain a permit from ODFW to relocate beavers to Alder Creek. ODFW guidelines for transplanting Beaver specify relocation sites should not have visible evidence of current occupation by beaver (e.g. fresh chewing, active dams, lodges, dens, forage caches, active channels, scent mounds) (ODFW 2012). Because there is recent evidence of beaver activity (fresh chewing, dam building activity upstream of headcut), ODFW would not issue a permit.

b. Beaver are currently present in the system, but have not stabilized the headcuts.

c. Current beaver activity is present only above the headcuts/incised channel. Below the headcuts, high flows are concentrated within the incised channel rather than spread across the floodplain. These concentrated flows increase water velocity through the reach. It is expected these flows would

breach dams constructed by beaver; explaining why current beaver sign is not present below the headcut within the incised channel.

2. Removal of Livestock Grazing with In-stream Restoration and Juniper Cutting and Burning Treatments

A Removal of Livestock Grazing Alternative in conjunction with in-stream restoration and juniper thinning was considered but eliminated from detailed analysis. Historic grazing practices, prior to BLM acquisition of Alder Creek, coupled with the agricultural endeavors and a historic loss of beaver are considered the cumulative causal factors for the channel instability. Current grazing practices in the Project Area are meeting Standards for Rangeland Health and are not considered a causal factor for the headcutting along Alder Creek. Continuing current management or fully removing livestock grazing would not rehabilitate or stop the active headcuts. Once a headcut is formed, it is self-enhancing and will migrate upstream until slope equilibrium or a non-erodible material is reached (Jewett et al., 2004). Adopting a Removal of Livestock Grazing management regime in the Project Area would not stabilize the active headcuts and would not meet the purpose and need for action.

Removal of livestock grazing is not expected to have an effect on the rate of expansion of western juniper. Invasion of juniper into big sagebrush communities appears to be directly related to the cessation of periodic fires (Burkhardt and Tisdale, 1976). Ongoing grazing is not a required mechanism to promote increasing woodiness on arid western rangelands (Soule and Knapp, 1999). Burkhardt and Tisdale (1976) found little relationship between range condition of big sagebrush-grass stands and the rate of juniper invasion. Adopting a Removal of Grazing management regime in the Project Area would not reduce encroached juniper and, therefore, would not meet the purpose and need for action.

Because of the above factors, this alternative was dropped from further analysis.

3. Proposed Action Using Route B

This alternative would access the Wet Meadow via Route B. This is a shorter route to the meadow and is less degraded than Route A. However, this route crosses approximately 4 miles of private land and 1.6 miles of public land. The BLM does not have an easement across the private land. In addition, there are four spring crossings which would need to be addressed for equipment to access the site. Building temporary crossings would be difficult and expensive as topography and soil type would require more than 50 cubic yards of rock to be placed in each crossing. This would necessitate obtaining permits from the Army Corps of Engineers and the Oregon Department of State Lands. Two of these crossings are on private lands. Route A was chosen because less road work would be needed for equipment to access the site. Distances would be greater for equipment to travel, but overall, costs should be less. Comments from earlier

scoping indicated public interest groups would rather keep road work at a minimum. Because of the above factors, this alternative was dropped from further analysis.

4. In-stream Restoration Without Use of Heavy Machinery

The BLM was asked during scoping to consider an alternative without the use of tracked vehicles. A suggested method was to helicopter materials in and place in-stream structures by hand or using draft horses. Draft horses could skid the logs used in the design to the edge of the incised channel. Trees with their root wads attached would cause soil disturbance as they are skidded to the site by horses. However, trees could be cut; branches trimmed and then skidded to the stream. This would reduce ground disturbance, but not eliminate it. Trees without root wads would provide less fish cover and habitat structure.

Large wood (minimum 10-inch diameter by 10-foot length) would need to be keyed into the bank (See Appendix B). This would require a total of 37 cubic yards of excavation. This is the equivalent of about 333 wheelbarrow loads, if each wheelbarrow has a 3 ft^3 capacity. This would take a 20 person hand crew approximately 2 days to complete (digging, loading, and transporting wheelbarrow nearby)[1]. The project plans also entail the construction of rock grade control structures and a roughened channel section. This would require an additional 115 cubic yards of excavation, the equivalent of 1,035 wheelbarrow loads. This excavation would take a 20 man crew approximately 6 days. If rock or clayey soils are encountered, this would take much longer. In addition, 340 cubic yards of fine-grained soil would be needed in the construction of the in-stream structures. This material would be collected upstream from the vertical streambanks. Collecting this material would take a 20 person crew approximately 17 days. In addition, 140 cubic yards of large rock (target diameter of 18 inches to 24 inches) would also need to be collected from the surrounding hillsides. It is hard to estimate the length of time it would take to harvest this by hand, but assuming it could be dug and transported via cart, additional time and cost would be incurred. For the purpose of this analysis, it is assumed it takes the same amount of time as collecting the fine-grained material, although it could conceivably take much longer, since this material is larger and heavier than fine-grained soil. With this assumption, it would take a 20 person crew 7 days to harvest the material. Construction of in-stream structures would take additional time. Given that construction requires backfilling and compacting soil around the newly created structures, the length of time for construction would be at least as long as the length of time for excavation - approximately 32 days. The total estimate for constructing this project using a 20 person crew would be 64 days.

[1] A berm removal project on other BLM lands took a 20 person hand crew 2, 10-hour days to remove 40 cubic yards – or approximately 400 man hours. This was roughly 10 man hours per cubic yard.

The in-stream work window, established by Oregon Department of Fish and Wildlife, is from October 1–March 1 for this stream. However, the site is located at about 5100' elevation and weather generally shuts down work in the area by November 15th and the area is not expected to be accessible again until after the March 1st date. Construction by hand during winter would also become more difficult with snow conditions. Given this, the actual work window for the project site is October 1–November 15 (about 45 days). It is not expected work done by hand and with draft horses would be finished in this time frame.

Because this alternative would not allow for timely completion during the in-stream work window, this alternative was dropped from further analysis.

CHAPTER III: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES (IDENTIFIED RESOURCES WITH ISSUES)

The BLM Burns District IDT has reviewed and identified issues affected by the alternatives through internal and external scoping. The following Affected Environment Table 2 summarizes the results of the review. The resources with no issues identified and listed as either not affected or not present will not be discussed further in this document. Resources with an issue(s) have questions analyzed in detail in this Chapter and are in **bold** in the following table.

Table 2: Affected Environment

Resources/Issues	Status	If Not Affected, why? If Affected, Reference Applicable EA Section and Issue Question.
Wetlands/Riparian Zones/Water Quality	**Affected**	**See Chapter III. 1. Water Quality, Wetland and Riparian** How would the alternatives affect water quality? What impacts to wetland and riparian habitat are expected?
Fish	**Affected**	**See Chapter III. 2. Fish** How would the alternatives affect fish habitat?
Special Status Species - Fauna	**Affected**	**See Chapter III. 3. Special Status Species - Fauna** How would the alternatives affect known Columbia Spotted Frog habitat?
Wildlife	**Affected**	**See Chapter III. 4. Wildlife** What are the losses of the shrub-steppe, riparian and wet meadow habitats, and woodland understory component resulting from juniper encroachment?
Migratory Birds	**Affected**	**See Chapter III. 5. Migratory Birds** What are the losses of shrub-steppe, wet meadow habitat, and the understory

		woodland component as related to migratory bird nesting, foraging, and roosting requirements?
Vegetation	**Affected**	**See Chapter III. 6. Vegetation** Would using tracked vehicles damage upland vegetation? Would utilizing soils from vertical streambanks to re-contour sites result in vegetation loss? How would removal of encroached juniper affect existing plant communities?
Forestry/Woodlands	**Affected**	**See Chapter III. 7. Forestry/Woodlands** Would either alternative restore the Project Area to its historic structure of open woodland?
Air Quality	**Affected**	**See Chapter III. 9. Air Quality** What are the air quality concerns associated with pile burning? Would air quality in Harney County or the Strawberry Wilderness be affected?
Fire Management	**Affected**	**See Chapter III. 10. Fire Management** How is fire management affected by either the No Action Alternative or the Proposed Action?
Noxious Weeds	**Affected**	**See Chapter III. 11. Noxious Weeds** What impacts would the Proposed Action have on noxious weed introduction and spread? How would noxious weeds be treated?
Biological Soil Crusts and Soils	**Affected**	**See Chapter III. 12. Soils/Biological Soil Crusts** Would using tracked vehicles damage biological soil crusts if they are present? Would utilizing soils from vertical streambanks to re-contour sites result in additional soil loss in the future?
Recreation	**Affected**	**See Chapter III. 13. Recreation** Would the alternatives have an effect on the recreation in the Project Area?
Areas of Critical Environmental Concern (ACEC)	Not Present	There are no ACEC or Research Natural Areas (RNA) within the Project Area.
American Indian Traditional Practices	Not Present	Tribal use for collecting economically important plant and animal species is not known to occur in the Alder Creek

		Project Area. In addition, known sacred sites do not occur in the Project Area. Consultation was conducted with the Burns Paiute Tribe during the scoping process. While they did not specify if they visit the proposed project area for traditional practices, they mentioned the loss of old growth juniper and inappropriately closed roads in the area.
Cultural Resources	Not Affected	Cultural resources are not known to occur within the proposed project area. An inventory of the meadow and adjacent uplands occurred in 2011. Cultural resources were found in the vicinity but not in the area of proposed riparian rehabilitation. Further inventory of proposed juniper cutting in the uplands above the meadow would be completed prior to juniper cutting and all newly discovered (if any) cultural resources sites would be avoided during the juniper cutting activity.
Environmental Justice	Not Present	Implementation of the alternatives would not have "disproportionately high and adverse human health or environmental effects" (H-1790-1) on minority populations and low-income populations as such populations do not exist within the Project Area.
Farmlands (prime or unique)	Not Present	There are no prime or unique farmlands in the Project Area.
Flood Plains	Not Present	Regulatory Floodways, as defined by the Federal Emergency Management Agency (FEMA) are not present in the Project Area.
Grazing Management	Not Affected	A livestock exclosure would be built around the meadow headcut site; however, the exclosure size would not reduce the amount of forage available in the allotment.
Hazardous Materials	Not Affected	The alternatives were designed with Project Design Elements (PDE) which prevent the release of hazardous materials into the environment and provide for notification procedures in

		the event of an accidental release.
Lands and Realty	Not Affected	The alternatives would not have a known effect to Lands and Realty because there are no existing third party rights. No easements would be required because the proposed access route runs entirely over public land.
Minerals	Not Affected	The Proposed Action and No Action would have no effect on BLM mineral leasing or mineral material sales within the Project Area or the Burns District. Relocating and reclaiming the area where mineral material is removed would have an undetectable effect to minerals.
Reclamation	Not Present	There are no reclamation areas within the Project Area.
Social and Economic Values	Not Affected	Economically there would be no affect; There would be a non-measureable increase to revenue for the town of Burns from the purchase of materials, housing, and food for the contract crew. Socially this project is located in a remote area that receives visitation from hunters and the effects have been disclosed under Recreation in Chapter III. 13.
Special Status Species - Flora	Not Present	There are no documented Special Status Plant species or designated critical habitat within the designated Project Areas.
Transportation/Roads	Not Affected	The Proposed Action would not affect the transportation system as there would be no new road construction, realignment, or upgrading of route category.
Visual Resources	Not Affected	The proposed project occurs within a VRM Class IV where activities may attract attention or may dominate the view. This proposed project is to prevent loss of wetland habitat and to improve water quality, and riparian and fisheries habitat which would not affect the VRM Class IV.
Wild and Scenic Rivers	Not Present	There are no wild and scenic rivers in

		this Project Area.
Wild Horses and Burros	Not Present	The Project Area is not within a Herd Management Area and there are no wild horses or burros located in the Project Area.
Wilderness, WSAs and Lands with Wilderness Characteristics	Not Present	There is no Wilderness, WSA, or Land with Wilderness Characteristics in the Project Area.
Threatened and Endangered Species - Flora	Not Present	There are no documented Threatened and Endangered (T&E) plant species or designated critical habitat within the Project Areas.
Threatened and Endangered Species - Fauna	Not Present	There are no known T&E species or Designated Critical Habitat in the Project Area, and none would be affected off-site by the proposed project activity.

This chapter details the Affected Environment section which is the baseline resource data displaying current conditions of each identified resource with an issue (i.e., the physical, biological, and cultural resources) that could be potentially affected by any of the alternatives discussed in Chapter II. For example, in the Affected Environment section for water quality in this EA, the Alder Creek wet meadow cooled water temperatures on average 9.6 percent. Without this baseline data there can be no effective comparison of alternatives. The intent of this chapter is to give enough information for the reader to compare the present with the predicted future condition resulting from enactment of the project activities (Environmental Effects discussed next) and for the decision maker to make an informed decision.

This chapter also details the Environmental Effects section which is the analytic basis for comparing the potential effects of enacting each of the alternatives detailed in Chapter II. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative effects are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions (RFFA) regardless of what agency or person undertakes such other actions. For example, in the Environmental Consequences discussion for water quality in this EA, it is stated that enactment of the No Action Alternative would likely result in water warming through the Wet Meadow.

The following environmental consequences discussions describe all expected effects including direct, indirect, and cumulative on resources from enacting the proposed alternatives. The EA described the current state of the environment (Affected Environment by resource, Chapter III) which included the effects of past actions. In addition, the Introduction Section of this EA, specifically the Purpose of and Need for Action, identifies past actions creating the current situation.
RFFAs include those Federal and non-Federal activities not yet undertaken, but sufficiently

likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These Federal and non-Federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. RFFAs do not include those actions that are highly speculative or indefinite. The RFFAs for this site are continued livestock grazing, weed treatments, and recreation activities; these are also relevant to cumulative effects and are discussed under each resource as applicable. Past actions and RFFAs vary under each resource because spatial and temporal scales address different variables such as wildlife set at a large scale versus upland vegetation set at a smaller scale where local management of the allotment has a direct affect.

Cumulative actions must fall within the geographic scope and timeframe of the actions of the proposed project. For the purposes of this EA, the cumulative effects analysis area (CEAA) for each resource extends to Crane Creek Watershed (5th field Hydrologic Unit Code [HUC]) and the overlapping part of the Stinkingwater Watershed (5th field HUC) within the Alder Creek Allotment (87,712 acres), unless otherwise stated. Actions beyond this distance are too removed from this project to result in measurable cumulative effects to resources of concern. Cumulative effects analysis looked at past projects having occurred in the last 35 years and RFFAs that are expected to occur over the next five to seven years (when treatments are expected to be completed) unless otherwise indicated in the environmental consequences section of the resource. Actions and events potentially contributing to cumulative effects within the watershed boundary (unless otherwise stated) were considered. Past actions occurring within the past 35 years within the CEAA considered are listed in the following table.

Table 3: Past actions within Project Area and Cumulative Effects Boundary

Prescribed Broadcast Burn Acres: 0 / 18	Wildfire Acres: 22,930	
BLM Cut and Hand Pile/Burn Acres: 20 / 20	**Year**	**Acres**
BLM Cut and Jackpot Burn Acres: 441 /2430	1983	1415
BLM Cut and Leave Acres: 363 / 1053	1985	69
Miles of Roads (paved and non-paved/natural surfaces): 14.6 / 200	1996	53
Miles of Fence: 6.6 / 138	2006	47
	2007	75
	2014	15,859
	The above acreages account for wildfires within the Cumulative Effects Boundary. Only 10 acres in the Project Boundary have been burned by wildfire (1996 burn).	

The only RFFAs within the geographic scope and timeframe affecting resources of concern include similar work occurring on other BLM and private lands currently ongoing or that are expected to take place within the next five to seven years. Emergency Stabilization and Rehabilitation actions associated with the Buzzard Complex fire are the only known projects planned within the Cumulative Effects Boundary.
The environmental consequences and cumulative effects sections in the Three Rivers Proposed

RMP/FEIS describe environmental consequences to the greater environment of the Alder Creek Project Area. Additional project-specific descriptions of environmental consequences are provided in the text below.

A. Identified Resource: Riparian, Wetlands, and Water Quality

1. Issue Questions

- How would the alternatives affect water quality?
- What impacts to wetland and riparian habitat are expected?

2. Affected Environment

The proposed Project Area lies within portions of Upper Crane Creek (6355 acres), Little Crane Creek (771 acres) and Little Stinkingwater Creek (61 acres) sub-watersheds (6th field HUC), which are all within the Upper Malheur Sub-basin (4th field HUC). [2]

Alder Creek and Crane Creek are the only perennial streams within the Project Area. In total, Crane Creek is approximately 27 miles long. Of this, 6 percent falls within the Project Area (1.6 miles). Alder Creek is 11.5 miles long and approximately 44 percent (5 miles) of the creek is within the Project Area.

Alder Creek originates on public land and flows for approximately 5 miles before reaching private land. Reach 1 (1 mile), from 5,380 to 4,940 feet elevation, flows intermittently[3] through a narrow valley floor and has an 8 percent gradient. Perennial[4] flow begins toward the end of this reach (approximately 4,960 feet elevation). The 1998 Proper Function Condition (PFC) Assessment[5] rated this reach at Proper Functioning Condition (PFC). A stream rated as PFC means it is in a state of resiliency that will allow a riparian-wetland system to hold together during a 25 to 30 year flow event, sustaining that system's ability to produce values related to both physical and biological attributes.

Reach 2 (1 mile), from 4,940 to 4,880 feet elevation, is terrace constrained within a moderately narrow to open valley floor. Figure 5 depicts the typical channel evolution following headcut formation. Most of this reach is between Stages III and IV. In the 1998 PFC Assessment, this reach was rated as Functioning At Risk

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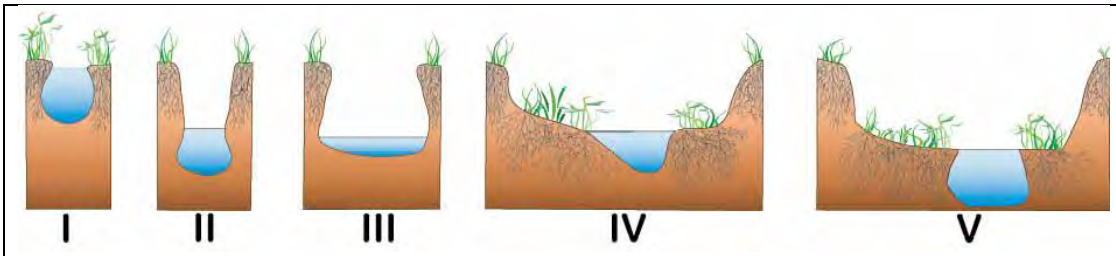
[2] HUC - Hydrologic Unit Code: The United States is divided and sub-divided into successively smaller hydrologic units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC). The 6th field HUC (sometimes known as 12th field HUC) is the smallest delineated unit in this hierarchy.

[3] Intermittent - Stream flow occurs only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas (Meinzer, 1923).

[4] Perennial - A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow (Meinzer, 1923).

[5] PFC - A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area.

(FAR) with an upward trend. A reach that is FAR has riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation. This reach has a very low gradient and is incised in places up to 10 or more feet. As depicted in Figure 3 in Chapter II, this reach has actively eroding streambanks contributing to elevated sediment loads. The Proposed Action would utilize the soil from these eroding banks for the Wet Meadow Restoration.



I. A properly shaped stream in **equilibrium** and connected to its floodplain prior to disturbance.
II. Channel incision from ditching or by a headcut originating in a channelized reach due to increased slope and flow.
III. Channel widening as the channel begins to meander again.
IV. A more properly shaped stream as it evolves to re-establish equilibrium and rebuild a new floodplain.
V. A new, properly shaped channel in equilibrium with a lowered floodplain.

Figure 5. ***Typical stream cross section evolution following headcut initiation. (Minnesota Department Natural Resources, 2010).***

Reach 3 (1 mile), from 4,880 to 4,840 feet elevation, has a very low gradient (less than one percent). The valley bottom widens into an open valley floor. This reach is characterized by a 34-acre wet marsh. This wetland is unique in the Three Rivers Resource Area. The nearest wetland of this size on BLM managed land is over 41 air miles away. The Alder Creek channel within the Wet Meadow above the headcut could be described as at Stage I in Figure 5, whereas below the headcut it is in Stages II–III. The headcuts proposed for treatment are at the downstream end of this meadow. This reach was rated as PFC during the 1998 PFC Assessment. However, because of the headcuts, the highest possible rating this reach could be currently rated is FAR. Below the headcuts, deep rooted riparian vegetation is dominant; however, the riparian zone is much smaller. The headcuts have shrunk the width of the floodplain from approximately 415 feet to approximately 25 feet wide.

Reach 4 (1.5 miles), from 4,840 to 4,580 feet elevation, is the last section of Alder Creek under BLM administration. It is predominately hillslope constrained in a narrow canyon. Gradient increases to 3 percent and mountain alder (*Alnus incana*)

is the dominant vegetation type. This section was considered to be PFC during the 1998 assessment.

Temperature data was collected on Alder Creek in 2005–2006 at two sites and at four sites in 2012. In 2012, temperature was collected where perennial flow begins, above and below the wet meadow and at the downstream Project Area boundary. The data collected indicates the exceedance of the Oregon Department of Environmental Quality (ODEQ) defined water temperature standard for summer stream temperature (68ºF) at all sites. In 2012, water temperatures warmed an average of 9.9 percent (6.6°F) over the course of the summer between the upper most site, where perennial flow begins, and just above the wet meadow —a distance of approximately 1.1 miles. Temperatures then cooled through the meadow, an average of 6.6°F or 9.6 percent over a distance of 0.8 mile. On average, temperatures continued to drop slightly (0.44°F or 0.48 percent) through the remainder of the Project Area—a distance of 1.3 miles. As the data indicates, the wet meadow offers a cooling mechanism for water temperature, improving water quality in Alder Creek.

Crane Creek within the Project Area drops in elevation from 4,830 to 4,480 feet over 1.5 miles. This section of Crane Creek is perennial and characterized by a moderate gradient (approximately 4.5 percent). It is hillslope constrained, flowing through a narrow valley floor. Dominant substrates are gravel, cobble, and boulder. The 1998 PFC rated this portion of the creek as PFC. The vegetation alternates between a red-osier dogwood (*Cornus sericea spp. sericea*) association and a mountain alder (*Alnus incana)*/red-osier dogwood association. Water temperature data collected in 2005 indicates attainment of the standard for summer stream temperature (68 ºF). In 2006, temperatures slightly exceeded the standard during the week of July 23rd. Temperatures have not been collected since.

The landscape surrounding Alder Creek is experiencing western juniper (*Juniperus occidentalis*) encroachment to varying degrees. “Early signs of western juniper domination on a site are canopy mortality of the shrubs in the interspace and the reduction of leader growth on sapling size (less than 10 ft tall) trees.” (Miller et al., 2005). This is apparent throughout Alder Creek Pasture. Pierson et al. (2007) showed during large thunderstorms, rill erosion on the western juniper hillslopes was over 15 times greater than on the hillslopes without western juniper. Studies also suggest the juniper canopy can greatly reduce the amount of precipitation reaching the soil surface (Miller et al., 2005). Ultimately, juniper dominance results in reduced flows and excessive sediment delivery to the two streams in the pasture: Alder Creek and Crane Creek.

3. Environmental Consequences

Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in

the CEAA contributing to cumulative effects to riparian, wetlands, and water quality include continued livestock grazing, Emergency Stabilization and Rehabilitation Actions from the 2014 Buzzard Complex Fire, and on-going weed treatments throughout the CEAA. The data necessary to quantitatively evaluate the relationship between some of the RFFAs and the Proposed Action and their cumulative impacts is unavailable and cannot be reasonably determined under our current capabilities. Only general cumulative impacts can be inferred. Erosion into waterways in the CEAA from the 2014 Buzzard Wildfire Complex will be occurring over the next few years. This wildfire burned across 15,589 acres, or 18 percent of the CEAA. The erosion from the wildfire will cumulatively add to water quality degradation described in the No Action Alternative or the Proposed Action. This cumulative effect will be seen primarily in the South Fork Malheur, which this watershed drains to. The South Fork Malheur is not listed as water quality impaired for sediment by the ODEQ.

Specific cumulative effects from ongoing livestock grazing throughout the CEAA cannot be determined from information available to the BLM. Private land accounts for 60 percent of the CEAA. Stocking levels, grazing intensity, and management plans on private lands would cumulatively affect water quality and riparian and wetland conditions in the CEAA. However, quantitative effects are unknown. Riparian areas surveyed for PFC Assessment on public land in the CEAA were rated at PFC or FAR with an unknown or upward trend. Current livestock grazing management in these allotments is designed to improve riparian conditions and therefore is presumably not causing degraded water quality in the South Fork Malheur River.

On-going weed treatments will be occurring throughout the CEAA. As long as SOPs for stream buffering and chemical application are followed there would be no measureable cumulative effects to water resources and wetlands/riparian areas.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: This alternative would result in additional loss of wet meadow and riparian habitat as both headcut types (meadow and small headcuts) migrate upstream. As a headcut advances upstream, the channel below becomes incised. Once incised, the stream loses access to its floodplain. Stream velocity and pressure on the streambed would then increase, further deepening the channel (Wilcox 2001). This would continue until slope equilibrium is reached. Lateral widening of the channel would then occur until a new floodplain of adequate size is created at this lower elevation (Wilcox 2001). The No Action Alternative would allow the remaining 34 acres of functioning wetland in Stage I, to convert to Stage II, an incised channel. It is unknown how much of the riparian area would be lost above the small

headcuts. These headcuts would move upstream until either slope equilibrium is reached or the headcut encounters a non-erodible surface (i.e. bedrock, boulders).

Channel incision results in degraded physical habitat, increased nonpoint source pollution and depleted fish species richness. (Shields Jr., Lizotte Jr., Knight, Cooper, and Wilcox, 2010). Incised streams have been found to generate two to three times the rates of suspended solids and turbidity than those streams that have not degraded (Shields Jr. et al., 2010).

Data indicates the wet meadow offers a mechanism for cooling water temperatures. In 2012, waters cooled through the meadow 9.6 percent or 6.6 degrees. In comparison, the upstream incised channel, temperatures increased by 9.9 percent or 6.34 degrees. With the No Action alternative, conditions in the wet meadow are expected to mirror upstream conditions and water temperatures would warm through this reach.

The No Action alternative is expected to degrade water quality.

EQUIPMENT ACCESS: Under this alternative, impediments to travel would not be removed from the access route. This would have no effect on Riparian, Wetlands, or Water Quality. Not removing boulders and juniper from the route would neither increase nor decrease road-induced erosion.

CONSTRUCTION: There would be no short term construction related sediment increases to Alder Creek. There would be no chance for an accidental spill of hazardous material to enter Alder Creek from construction related activities.

GRAZING EXCLUSION OF WET MEADOW: Under this alternative, the 34-acre Alder Creek Wet Meadow would not be excluded from grazing. Livestock would continue to access the wet meadow during permitted use dates. However, current livestock grazing management is designed to improve riparian conditions and is achieving the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Oregon and Washington BLM. By itself, continued authorized grazing under this alternative would not prevent the attainment of Proper Functioning Condition. However, the existing headcuts would continue to advance through the meadow with the selection of this alternative—which would prevent this reach from attainment of PFC.

(2) JUNIPER TREATMENT

The watershed surrounding Alder and Crane Creeks is dominated by encroached juniper, which also contributes to elevated sediment loads. Juniper dominance on a site has been shown to decrease shrub and

herbaceous vegetation cover (Burkhardt and Tisdale, 1969; Adams, 1975; Knapp and Soule', 1998; Bunting, Kingery, and Stand, 1999; Miller, Svejcar, and Rose, 2000; Roberts and Jones, 2000). With this loss, soil is more prone to increased soil crusting, decreased infiltration, and increased erosion (Pierson, Blackburn, Van Vactor, and Wood, 1994). Under the No Action alternative, increased runoff and erosion from surrounding hillsides is expected to occur, exacerbating excess sediment loads into Alder and Crane Creeks.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to riparian areas, wetlands, or water quality from applying the additional available herbicides under this alternative. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: This alternative would stabilize the existing headcuts along Alder Creek, thus arresting their upstream migration. Wet meadow and riparian habitats upstream of the headcuts would be preserved. A ponded area would be created within the incised wet meadow channel allowing for slow capture of sediment eventually resulting in a lower depth to groundwater in areas already converted to dry/upland meadow. Lowering the depth to groundwater would allow re-establishment of wetland obligate or facultative plants and eventually recover the wetland acreage lost to channel incision.

Water quality would improve under this alternative. With upstream bank reshaping, sediment entering the channel from incised banks would be reduced wherever bank reshaping occurs. Sediment entering the channel from the headcuts themselves would greatly decrease.

EQUIPMENT ACCESS: Under this alternative, impediments to travel would be removed from the access route. This type of spot removal would have no measurable effect on riparian areas, wetlands, or water quality. Spot removal of boulders and juniper would disturb one percent or less of the road system in the CEAA and therefore would not result in a measureable increase or decrease to road-induced erosion.

CONSTRUCTION: During construction activities, there is the opportunity for hazardous material from equipment to spill into Alder Creek and the

wet meadow. PDE's outlined in the Proposed Action are designed to minimize this risk.

Short term increases in sediment are expected during construction activities. Construction activities would be isolated where feasible from the active flowing stream to minimize disturbance to water quality. However, an increase in construction related sediment would be expected during periods when in-stream work occurs for approximately 2–3 weeks.

GRAZING EXCLUSION OF WET MEADOW: Excluding grazing from the wet meadow would prevent livestock from trampling in-stream structures. This would prevent structure instability while stabilizing vegetation is establishing.

In addition, terraces occupied by shallow rooted, upland vegetation would transition back to a wetland community following headcut restoration. During this recovery period, streambanks are vulnerable to livestock hoof sheer. Removal of livestock would allow for faster expansion of deep rooted riparian obligate species to stabilize the newly constructed stream channel and the surrounding wetland.

(2) JUNIPER TREATMENT

Reducing competition from juniper in riparian zones should facilitate recovery of deciduous woody and herbaceous riparian communities to a more historic regime. This would improve watershed stability and function by reducing bare soil and sediment inputs, stabilizing banks, increasing infiltration, and maintaining or restoring proper storage and release of groundwater important for late season flows and temperatures.

(3) WEED TREATMENT

Based on the findings of the Ecological Risk Assessments and following Standard Operating Procedures as outlined in the 2010 Oregon Vegetation Management EIS, the potential risk to riparian and wetland plants or the depreciation of water quality would be negligible, especially at a watershed level. Effects by herbicide on resources are identified in Appendix C.

B. Identified Resource: Fish

1. Issue Questions

- How would the alternatives affect fish habitat?
- How would the Proposed Action affect fish movement (passage)?

2. Affected Environment

The proposed Project Area contains two perennial fish-bearing streams, Alder Creek and Crane Creek. These two streams provide habitat for redband trout (*Oncorhynchus mykiss*), a Bureau sensitive species. Within the Alder Creek wet meadow, Alder Creek had one of the two highest redband trout densities of all waters draining to and including the South Fork Malheur River (Bangs, Gunckel, and Jacobs, 2008). This indicates that the Wet Meadow provides high quality fish habitat for redband trout.

Redband trout are generally temperature tolerant, but prefer temperatures between 50 to 59°F with critical thermal maxima of 82.4–87.44°F (Gamperl and Rodnick 2003). Water temperature data was collected on two sites on Alder Creek in 2005 and 2006 and at four sites in 2012. These sites did not meet ODEQ water temperature standards for redband trout (68°F) during summer months. However, the data demonstrates Alder Creek Wet Meadow provides cold water refuge for fish during the summer.

Crane Creek water temperature data collected in 2005 met the standard for summer stream temperature (68 ºF). In 2006, temperatures slightly exceeded the standard in late July.

The fish population in Alder Creek is isolated from the larger stream network by a passage barrier approximately four miles downstream of BLM management on private land (ODFW 2013). In addition, at least one of the headcuts in the Wet Meadow has been a passage barrier for redband trout during low flows or drought years. While leaping capabilities for redband trout have not been well documented, other fish species have been studied. Waterfall height, plunge pool depth, and fish size are primary attributes affecting passage of a given barrier (Kondratieff, 2006). When looking at Brook trout leaping capabilities—it was shown that when a plunge pool was less than 10 cm (4 inches) deep, passage approached zero for all size classes of fish (Kondratieff, 2006). For the purpose of this analysis, it is assumed redband trout would have similar plunge pool depth requirements as brook trout. In at least two site visits over the past five years, monitoring has shown that plunge pool depth at Headcut Four (as depicted in Appendix B - Construction Plans) approached the minimum 4-inch depth for passage and in 2007, the channel below this headcut was even dry. On these years, passage would have been blocked here during low flows. In addition, Headcut Four has a 3.75-foot vertical height during low flows. One study has suggested using a 4-foot vertical fall as a maximum vertical barrier for resident salmonids (which redband trout would be considered). Four feet would represent the maximum height an adult could jump given ideal conditions (including an adequate plunge pool). Headcut Four is 3.75 feet high and would likely impede passage for juveniles, which would not have the same leaping capability as adults. Given this, passage, at a minimum, is impeded at Headcut Four in the Wet Meadow.

Figure 6. Headcut Four in the Alder Creek Wet Meadow during low flow conditions. Photo shows minimal plunge pool in 2007. This headcut is likely a barrier to fish movement during low flows.

3. Environmental Consequences

The Cumulative Effects Analysis Area (CEAA) for fish is limited to the sub-watershed boundary - 6th field HUC (39,798 acres). Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to fish include continued livestock grazing, Emergency Stabilization and Rehabilitation Actions from the 2014 Buzzard Complex Fire, and the continuation of an existing fish passage barrier at Alder Creek Reservoir, which is 4 miles downstream of the project area on private land. Cumulative effects from the Buzzard Complex wildfire and the associated rehabilitation would only be applicable to the fish population in Crane Creek. The fish passage barrier on Alder Creek Reservoir isolates the Alder Creek population of redband trout from the effects of the 2014 Buzzard Complex wildfire. However, the Crane Creek population still has access to downstream habitats that would have been affected by the wildfire.

The data necessary to quantitatively evaluate the relationship between continued livestock grazing and Emergency Stabilization and Rehabilitation Actions and their cumulative impacts is unavailable and cannot be reasonably determined under our current capabilities. Only general cumulative impacts for these actions can be inferred. Erosion into waterways in the CEAA from the 2014 Buzzard Wildfire Complex will be occurring over the next few years. This wildfire burned across 15,589 acres, or 18 percent of the CEAA. The erosion from the wildfire will cumulatively add to water quality degradation, which affects fish habitat described in the No Action Alternative or the Proposed Action. This cumulative effect will be seen primarily in the South Fork Malheur, which this watershed drains to.

Specific cumulative effect from ongoing livestock grazing throughout the CEAA for 60 percent of the CEAA—stocking levels, grazing intensity, and management plans on private lands would cumulatively affect water quality and riparian area and wetland conditions in the CEAA. As described in the Environmental Consequences section below, riparian area condition and water quality directly affect fish habitat. Much of this information is unknown or unavailable as the majority of riparian habitat in the CEAA is under private ownership. On public land, riparian areas surveyed for Proper Functioning Condition Assessment in the CEAA were rated at PFC or FAR with an unknown or upward trend. Current livestock grazing management in these allotments is designed to improve riparian conditions and therefore is presumably not causing degraded water quality and fish habitat in the South Fork Malheur River.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Fish and aquatic habitat quality directly relates to riparian condition and water quality. Meyer, Lamansky, and Schill (2010) found that summer water temperatures strongly correlated to the occurrence of redband trout in small order streams. They also found a negative relationship between redband trout occurrence and percentage of fine substrate in the channel bottom.

Likewise, riparian condition also plays an important role in fish habitat. Riparian vegetation provides stream shade, which attenuates stream temperature and adds to streambank stability and cover and insect (food base) production, which are all important to trout habitat (Hunter, 1991; Reeves and Roelofs, 1982). As described in the Riparian, Wetland, and Water Quality section, as the existing headcuts (meadow and small headcuts) continue migrating upstream, riparian condition and water quality degrade. This degradation would result in a loss of quality fish habitat. Effects of this alternative would likely lead to lower numbers of redband trout in this system.

Fish passage through the Wet Meadow would not improve under this alternative.

EQUIPMENT ACCESS: This alternative would neither increase nor decrease current levels of road-induced erosion and therefore would have no effect to fish habitat.

CONSTRUCTION: There would be no short term construction related disturbances to fish or fish habitat under this alternative.

GRAZING EXCLUSION OF WET MEADOW: Under this alternative, the 34-acre Alder Creek Wet Meadow would not be excluded from grazing. Livestock would continue to access the wet meadow during permitted use dates. However, current livestock grazing management is designed to improve riparian conditions and is achieving the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Oregon and Washington BLM. By itself, continued authorized grazing under this alternative would allow for the maintenance of fish habitat. However, the existing headcuts would continue to advance through the meadow with the selection of this alternative—which would ultimately degrade fish habitat.

(2) JUNIPER TREATMENT

The watershed surrounding Alder and Crane Creeks would continue to be dominated by juniper under this alternative. Juniper dominance decreases shrub and herbaceous cover (Burkhardt and Tisdale, 1969; Adams, 1975; Knapp and Soule, 1998; Bunting et al., 1999; Miller et al., 2000; Roberts and Jones, 2000). With this loss, increased soil crusting, decreased infiltration, and increased erosion would occur (Pierson et al., 1994). Under the No Action alternative, increased runoff and erosion from surrounding hillsides is expected, further contributing to sediment delivery to Alder and Crane Creeks.

Chronic sediment delivery reduces spawning habitat and reproductive success of fish by smothering eggs or trapping newly-hatched fish in the gravels below the streambed surface. Elevated sediment also reduces available habitat for both fish and macroinvertebrates (which are an important food source for fish). Increased sedimentation reduces pool habitat (which is important for cover), over-wintering habitat, and thermal refuges during temperature extremes. Studies have shown sediment inputs resulting in substrate embeddedness of greater than one-third can result in a decrease in benthic invertebrate abundance; thus decreasing food available for juvenile salmonids (Waters, 1995).

(3) WEED TREATMENT

With the No Action Alternative there would be no additional effects to fish. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: The Proposed Action would halt the upstream migration of the existing headcuts on Alder Creek. The wet meadow, as well as riparian habitats upstream of the small headcuts, would not undergo channel incision as described in the Riparian, Wetland, and Water Quality section. By stopping the degradation associated with channel incision, fish habitat would be maintained in the wet meadow, where one of the highest densities of redband trout in the CEAA is found.

In addition, fish habitat within the incised channel below the headcuts in the Wet Meadow would be improved. A long pool would be created within the incised channel. The series of log structures placed along the incised channel would trap sediment and debris and start the long natural process of replacing sediment removed by the headcutting. These structures would create pool habitat, shade, and provide cover from predators, all of which the current incised channel lacks. Live willows and alders would be planted along the incised channel which would provide additional shade and fish cover.

The proposed Wet Meadow headcut restoration is designed to allow for juvenile fish passage. The structures themselves would not limit movement and the creation of the long pool within the incised channel would decrease jump height at Headcut Four and increase plunge pool depth. The targeted future channel grade would eliminate vertical headcut barriers and allow for unimpeded fish passage through the Wet Meadow. This would allow for fish movement from the headwaters of Alder Creek to the Alder Creek Reservoir—allowing for approximately seven miles of unobstructed stream access.

Where bank sloping occurs upstream of the wet meadow, the active floodplain would widen. This would eliminate the negative effects of excessive sediment to fish habitat from the adjacent vertical terrace walls.

EQUIPMENT ACCESS: Under this alternative, impediments to travel would be removed from the access route. This type of spot removal would have no measurable effect on fish habitat. Spot removal of boulders and juniper would disturb one percent or less of the road system in the CEAA and therefore would not result in a measureable increase or decrease of road-induced sediment entering streams/fish habitat.

CONSTRUCTION: Headcut restoration could result in temporary increases in suspended sediment during construction activities, which would last approximately two to three weeks. However, flows would likely be low during the in-stream work window (fall) and all work areas would be isolated from the active flow. Native material and plastic sheeting, or other approved methods, would be placed on undisturbed

streambed to confine flow, provide fish passage, and isolate the construction areas from the active stream flows. If necessary, fish salvage would be conducted. This would minimize impacts to fish and fish habitat.

GRAZING EXCLUSION OF WET MEADOW: Excluding grazing from the wet meadow would prevent livestock from trampling in-stream structures. This would prevent structure instability while stabilizing vegetation is establishing.

In addition, terraces occupied by shallow-rooted, upland vegetation would transition back to a wetland community following headcut restoration. During this recovery period, streambanks are vulnerable to livestock hoof sheer. Removal of livestock would allow for faster expansion of deep rooted riparian obligate species to stabilize the newly constructed stream channel and the surrounding wetland. Greater stability would improve fish habitat by decreasing erosion and increasing stream shade and would improve channel morphology with the formation of overhanging banks.

(2) JUNIPER TREATMENT

Species such as redband trout appear to be well adapted to pulsed disturbances such as those created by fire (Rieman and Clayton, 1997). Therefore, fish species present in the Project Area are not expected to be adversely affected by disturbances to habitat resulting from juniper cutting, piling, burning, or girdling activities.

Removal of juniper and pile burning would stimulate regeneration of some riparian species (e.g., aspen) which have become decadent due to fire exclusion, thereby contributing to stream shading and thermal buffering. Some girdled juniper would fall into the stream channel and provide cover and habitat complexity for fish.

Temporary effects to fish species from juniper treatments would occur from additional input of sediment and decreased shade to the stream following juniper removal. Burning of piles would result in a very patchy burn pattern. This would minimize sediment delivery to streams as sediment trapping vegetation would still remain.

(3) WEED TREATMENT

Based on the findings of the Ecological Risk Assessments and following Standard Operating Procedures as outlined in the 2010 Oregon Vegetation Management EIS, the potential risk to fishes from ingestion or direct contact or depreciation of water quality would be negligible, especially at the population or watershed level. Effects by herbicide on resources are identified in Appendix C.

C. Identified Resource: Special Status Species - Columbia Spotted Frog

1. Issue Question

- How would the alternatives affect known Columbia Spotted Frog habitat?

2. Affected Environment

The Project Area provides habitat for Columbia Spotted Frog (*Rana luteiventris*), a BLM designated Special Status Species (SSS) and a United States Fish and Wildlife Service (USFWS) candidate species for listing under the Threatened and Endangered (T&E) Species Act. Monitoring efforts revealed the species' presence in the Project Area on multiple occasions from 2001 through 2009. In general, Columbia Spotted Frogs utilize semi-aquatic and aquatic habitats such as wetlands, seeps, springs, streams, ponds, and other areas supporting riparian, mesic, and aquatic vegetation (Welch and MacMahon, 2005). These habitat features are used throughout the year for three distinct life (biological) processes: breeding, foraging, and hibernation (Munger et al., 1996).

Spring breeding is composed of the actual breeding, egg-laying, and tadpole metamorphosis. Success of these processes can be affected by site conditions such as: water velocity, temperature, depth, pH, and predator evasion (Munger et al., 1996; USFWS, 2012). These variables are related and often times strongly affected by the factors impacting drainage areas contributing water to the aquatic sites used directly by the Columbia Spotted Frog. Adult frogs feed opportunistically on insects and other amphibians, while tadpoles feed primarily on algae and detritus (Reaser and Pilliod, 2005, p. 560). Columbia Spotted Frogs spend the winter in a state of hibernation or torpor. Typically frogs would winter under the ice in ponds, in springs with overhanging vegetation, or in a silt substrate.

Ideally, Columbia Spotted Frog habitat would be composed of slow moving water through meadow system with a marsh or a wetland component, transitioning into a riparian area with ponds, characterized by diverse aquatic vegetation. The wet meadow in the project area is suitable habitat for Columbia Spotted Frog. While the incised reaches may still offer suitable habitat for Columbia Spotted Frogs it is not near the quality of habitat the wet meadow offers.

The Project Area is within Greater Sage-Grouse general habitat, but not in low density habitat as delineated by ODFW. There are no active, pending active, or complex leks within or in the vicinity of the Project Area. The closest active lek is approximately 9.1 air miles from the project boundary. Currently the Project Area has low habitat suitability, even at the general habitat capacity, due to juniper encroachment and topography of the areas. For these reasons sage-grouse will not be analyzed further in this document.

3. Environmental Consequences

For the purposes of this analysis, the cumulative effects analysis area (CEAA) for SSS - Terrestrial Fauna, extends to Crane Creek watershed and the overlapping part of the Stinkingwater watershed with the Alder Creek Allotment. This area should encompass the upland systems draining into Alder Creek, supplying water and nutrients. Existing vegetation communities in the Project Area are fairly representative of those across the CEAA, with the exception of riparian area and wet meadow on Alder Creek itself. Past and present actions and events, such as those described in Affected Environment, have influenced the existing environment within the CEAA. Reasonably foreseeable future actions in the CEAA contributing to cumulative effects to SSS - Terrestrial Fauna and habitat include livestock grazing, wildfire, hunting, and other recreational pursuits. Past and RFFAs that have affected Columbia Spotted Frog or its habitat in the CEAA are listed in Table 3.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Habitat loss has been identified as a primary threat to the Columbia Spotted Frog and implicated as a cause in population decline (USFWS 2008). Channel incision has been identified as a direct threat to the Columbia Spotted Frog (USFWS 2012). Channel incision in meadows characterized by marshlands and wetlands alters the hydrologic function and biotic processes mainly by depleting the water table. Once the water table drops, the vegetation community changes from a wet meadow to upland grass/shrub communities. Under the No Action alternative the current channel incision would continue causing water table depletion. This would eventually lead to a vegetation community change from wet meadow to upland grass/shrub community which would result in a loss of Columbia Spotted Frog habitat. It is likely that, if left unchecked, stream channel incision would continue, eventually leading to the loss of the majority of wet meadow habitat. All of this would reduce the amount of Columbia Spotted Frog habitat in the project area. In the long-term, up to 34 acres of suitable Columbia Spotted Frog habitat could be lost as a result of the no-headcut-restoration treatment.

EQUIPMENT ACCESS: This alternative would neither increase nor decrease current levels of road-induced erosion and therefore would have no effect to Columbia Spotted Frog habitat.

CONSTRUCTION: There would be no construction related disturbances to Columbia Spotted Frogs or their habitat under this alternative.

GRAZING EXCLUSION OF WET MEADOW: Under this alternative, the 34-acre Alder Creek Wet Meadow would not be excluded from grazing. Livestock would continue to access the wet meadow during permitted use dates. However, current livestock grazing management is designed to improve riparian conditions and is achieving the 1997 Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Oregon and Washington BLM. By itself, continued authorized grazing under this alternative would allow for the maintenance of Columbia Spotted Frog habitat. However, the existing headcuts would continue to advance through the meadow with the selection of this alternative, ultimately degrading and reducing the quantity of Columbia Spotted Frog habitat.

(2) JUNIPER TREATMENT

The watershed surrounding Alder and Crane Creeks is dominated by encroached juniper, which also contributes to elevated sediment loads. Juniper dominance on a site has been shown to decrease shrub and herbaceous vegetation cover as well as ground water (Burkhardt and Tisdale, 1969; Adams, 1975; Knapp and Soule', 1998; Bunting, et al., 1999; Miller et al., 2000; Roberts and Jones, 2000). With this loss, soil is more prone to increased soil crusting, decreased infiltration, and increased erosion (Pierson, et al., 1994). All of this would likely decrease the quality and potentially even the quantity of Columbia Spotted Frog habitat in the project area.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to Columbia Spotted Frogs from applying the additional available herbicides under this alternative. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: The Proposed Action would halt the upstream migration of the existing headcuts on Alder Creek. The wet meadow, as well as riparian habitats upstream of the small headcuts, would not undergo channel incision as described in the Riparian, Wetland, and Water Quality section. By stopping the degradation associated with channel incision, Columbia Spotted Frog habitat would be maintained in the wet meadow.

In addition, Columbia Spotted Frog habitat within the incised channel below the headcuts in the Wet Meadow would be improved. A long pool would be created within the incised channel. The series of log structures placed along the incised channel would trap sediment and debris and start the long natural process of replacing sediment removed by the headcutting. These structures would create pool habitat, shade, and provide cover from predators, all of which the current incised channel lacks. Live willows and alders would be planted along the incised channel which would provide additional shade and cover.

Where bank sloping occurs upstream of the wet meadow, the active floodplain would widen. This would eliminate the negative effects of excessive sediment to Columbia Spotted Frog habitat from the adjacent vertical terrace walls. All of the above will improve conditions for Columbia Spotted Frogs and their habitat.

EQUIPMENT ACCESS: Under this alternative, impediments to travel would be removed from the access route. This type of spot removal would have no measurable effect on Columbia Spotted Frog habitat. Spot removal of boulders and juniper would disturb one percent or less of the road system in the CEAA and therefore would not result in a measureable increase or decrease of road-induced sediment entering streams/Columbia Spotted Frog habitat.

CONSTRUCTION: Headcut restoration could result in temporary increases in suspended sediment during construction activities, which would last approximately two to three weeks. However, flows would likely be low during the in-stream work window (fall/winter) and all work areas would be isolated from the active flow. Columbia Spotted Frogs would be in the hibernation life cycle stage when construction activities are taking place, thus reducing the risk of disturbance. In addition, the vast majority of hibernating frogs will be located in areas of the meadow that are in good shape and away from construction activities. All of the above would minimize any associated effects on Columbia Spotted Frogs and their habitat in the project area.

GRAZING EXCLUSION OF WET MEADOW: Excluding grazing from the wet meadow would prevent livestock from trampling in-stream structures. This would prevent structure instability while stabilizing vegetation is establishing.

In addition, terraces occupied by shallow-rooted, upland vegetation would transition back to a wetland community following headcut restoration. During this recovery period, streambanks are vulnerable to livestock hoof sheer. Removal of livestock would allow for faster expansion of deep rooted riparian obligate species to stabilize the newly constructed stream

channel and the surrounding wetland. Greater bank stability would improve Columbia Spotted Frog habitat by decreasing erosion, increasing stream shade, and improving channel morphology with the formation of overhanging banks. All of the above will have beneficial effects to Columbia Spotted Frogs and their habitat.

(2) JUNIPER TREATMENT

Columbia Spotted Frogs present in the Project Area are not expected to be adversely affected by disturbances to habitat resulting from juniper cutting, piling, burning, or girdling activities.

The removal of juniper should free up more ground water to feed into the springs and creeks of the project area. In addition, the removal of juniper and pile burning would stimulate regeneration of some riparian species (e.g., aspen) which have become decadent due to fire exclusion, consequently contributing to stream shading and thermal buffering. Some girdled juniper would fall into the stream channel and provide cover and habitat complexity for Columbia Spotted Frogs. All of the above should benefit Columbia Spotted Frogs in the project area.

Temporary effects to Columbia Spotted Frogs from juniper treatments would occur from additional input of sediment to the stream following juniper removal. Burning of piles would result in a very patchy burn pattern. This would minimize sediment delivery to streams as sediment trapping vegetation would still remain.

(3) WEED TREATMENT

Based on the findings of the Ecological Risk Assessments and following Standard Operating Procedures as outlined in the 2010 Oregon Vegetation Management EIS, the potential risk to Columbia Spotted Frogs from ingestion or direct contact or depreciation of water quality would be negligible, especially at the population or watershed level. Effects by herbicide on resources are identified in Appendix C.

D. Identified Resource: Wildlife

1. Issue Question

- What are the losses to the shrub-steppe, riparian and wet meadow habitats, and woodland understory component resulting from juniper encroachment?

2. Affected Environment

The Project Area is located in an upland system, with 12 to 16 inches of

precipitation annually. The landscape is composed of: hillsides, canyons, tablelands, mountainsides, escarpments, and meadows.

Past and present actions and events influencing wildlife include: wildfires, livestock grazing, seeding, fuels reduction and restoration treatments, road development, fence installation, and recreational activities.

Elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*) use the area in the winter, during seasonal migrations, and on a yearlong basis. The allotment provides important shrub communities, such as sagebrush, bitterbrush, and curled leaf mountain mahogany. Antelope bitterbrush is considered a key forage component of habitat for mule deer (Kufeld et al., 1973). Ungulates are dependent on browse species in the winter season when forage is limited (Bender et al., 2007). In the spring and early summer, ungulate species use both annual and perennial forb species when available. Forbs are an important component of deer and pronghorn diets especially coming out of the winter season when their fat reserves are low and females are in the last trimester of their gestation period. Forbs are typically very palatable and contain a high percentage of protein. The wet meadow area offers valuable nutrition, especially for elk, during the late summer and fall seasons when upland vegetation has dried and lost much of its nutritional value.

Ninety-nine percent of the Project Area is within mule deer and elk winter range as defined by the ODFW. Mule deer populations are below management objective in this game unit. Elk and pronghorn are within management objective in this game unit.

Currently there are 225 AUMs allocated for deer, 196 AUMs allocated for elk, and 13 AUMs allocated for Pronghorn in the allotment (Three Rivers RMP 1992).

Other wildlife expected in the allotment includes coyote (*Canis latrans*), bobcat (*Lynx rufus*), beaver (*Castor canadensis*), and several smaller mammals, as well as reptiles and amphibians. These animals may reside in the Project Area on a yearlong or temporary basis when foraging or passing through the area during daily or seasonal movements.

3. Environmental Consequences

For the purposes of this analysis, the CEAA for wildlife extends to Crane Creek Watershed (5th field HUC) and the overlapping part of the Stinkingwater Watershed (5th field HUC) with the Alder Creek Allotment. This area should encompass regular movements of wildlife using the Project Area. Existing vegetation communities in the Project Area are fairly representative of those across the CEAA, with the exception of riparian area and wet meadow on Alder Creek itself. Past and present actions and events, such as those described in the Affected Environment, have influenced the existing environment within the

CEAA. Reasonably foreseeable future actions in the CEAA contributing to cumulative effects to wildlife and habitat include livestock grazing, hunting, and other recreational pursuits. Past actions affecting wildlife or habitat in the CEAA are listed in Table 3.

Alternatives analyzed in this document may incrementally affect wildlife through disturbance and temporary reductions of herbaceous and shrub plant cover. Disturbance would be limited to the short period during the actual construction (approximately October 1–November 15) and tree cutting.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Under the No Action Alternative, there would be no repairing of headcuts along Alder Creek. Soil would continue to be eroded and washed away along the streambanks. Channel incision would continue moving upstream through the meadow, lowering the water table. As this occurs, meadow forage production would continually decrease. Over time, the area would likely only offer a narrow corridor of riparian species for wildlife to utilize.

EQUIPMENT ACCESS: Wildlife would not be impacted because roads would not be improved nor would equipment be brought in to the project area.

CONSTRUCTION: There would be no construction related disturbances to wildlife species or their habitat under this Alternative since construction activities would not occur.

GRAZING EXCLUSION OF WET MEADOW: Under this alternative, the 34-acre Alder Creek wet meadow would not be excluded from grazing. Livestock would continue to access the wet meadow during permitted use dates. There would be direct disturbance effects to wildlife using the wet meadow area while livestock are in the pasture. There would also be less forage available for wildlife in the wet meadow area on years that the Alder Creek Pasture is grazed.

(2) JUNIPER TREATMENT

Plant communities would continue to transition toward juniper woodlands with reduced herbaceous understory. Browse species (bitterbrush, big sagebrush, currant, and mahogany) would continue to decrease in quantity, health, and vigor. This would decrease habitat quality for big game species as well as several bird and small mammal species utilizing these habitats (Miller et al, 2005). Thermal and hiding cover would increase under this

alternative if a stand-replacing wildfire did not occur. Sagebrush and bunchgrasses would be greatly reduced by juniper encroachment thus providing fewer habitats for sagebrush lizards and small mammals, which provide an important prey base for larger predators.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to wildlife species from applying the additional available herbicides under this alternative. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

Disturbance during treatment implementation (stream restoration, juniper and weed treatments) would cause short-term displacement of deer and other wildlife in the immediate Project Area. The effects of the Proposed Action combined with past, present, and RFFAs would not cumulatively impact wildlife or habitat, but would contribute to maintenance and restoration of wetland and open sagebrush communities important for wildlife.

(1) HEADCUT RESTORATION:

MEADOW AND SMALL HEADCUT RESTORATION: The Proposed Action would halt the upstream migration of the existing headcuts on Alder Creek. The wet meadow, as well as riparian habitats upstream of the small headcuts, would not undergo channel incision as described in the Riparian, Wetland, and Water Quality section. By stopping the degradation associated with channel incision, the wet meadow and upstream riparian corridor would continue to be available for wildlife species to utilize.
Historic wet meadow habitat, now comprised mainly of upland species due to the incised channel below the headcuts, would be restored and returned to a wet meadow community under this alternative. Where bank sloping occurs upstream of the wet meadow, the active floodplain would widen creating more riparian habitat. All of the above, along with the riparian plantings outlined in the proposed action, will result in higher quality and an increased quantity of riparian and wet meadow habitat for wildlife to utilize.

EQUIPMENT ACCESS: Under this alternative, equipment would be mobilized to the project area and some impediments to travel would be removed from the access route. This type of spot removal and accessing the site would have some disturbance effects to wildlife on the way in and

out. Wildlife would most likely flee the area of disturbance. This effect would be very short-lived and cease once equipment moved out of the area.

CONSTRUCTION: Headcut restoration construction would have direct disturbance effects to wildlife in the immediate area. Most wildlife species would likely flee the area during construction activities. This disturbance would be short-lived and cease once construction activities had finished.

GRAZING EXCLUSION OF WET MEADOW: Excluding grazing from the wet meadow would prevent livestock from accessing the meadow eliminating all livestock/wildlife interaction disturbances and competition in the wet meadow. All of the forage in the wet meadow would be made solely available for wildlife. Making the wet meadow solely available for wildlife would likely improve the health of wildlife species that utilize this wet meadow area and may help keep big game populations off of adjacent private irrigated fields.

(2) JUNIPER TREATMENT

Treatments would reduce juniper cover and cause an increase in grasses, forbs, and shrubby browse species increasing health, vigor, and palatability of forage for deer, pronghorn, and elk using the area.

Creating or maintaining a mosaic of habitat types from scattered juniper, big sagebrush, low sagebrush, and bitterbrush stands across the Project Area is expected to enhance wildlife habitat and increase species diversity.

Piling down juniper would cause a reduction in hiding cover currently used by ungulates in the Project Area. However, the remaining shrub, riparian woody shrub species, Douglas fir, and juniper in areas adjacent to the Project Area should provide ample hiding cover.

The Proposed Action would improve sagebrush steppe habitat and help disperse utilization by both wildlife and livestock as desirable vegetation is reestablished following juniper treatments.

(3) WEED TREATMENT

All weed treatments outlined in the Proposed Action will lessen the risk of the establishment of undesirable weed species or annual grasses. This, coupled with seeding a mix of desirable native and non-native grass species, should help maintain or improve forage quality and quantity for wildlife in the project area. See Appendix C for detailed effects to wildlife species.

E. Identified Resource: Migratory Birds

1. Issue Question

- What are the losses of shrub-steppe, wet meadow habitats, and the understory woodland component as related to migratory bird nesting, foraging, and roosting requirements?

2. Affected Environment

The project and surrounding area mainly provide habitat for migratory land birds preferring sagebrush, grassland, and juniper woodland habitats. The project area also offers a unique wet meadow/riparian habitat in an otherwise rather arid environment making it suitable for waterfowl and birds associated with wetland habitats. These habitat types can support relatively high migratory bird species richness compared to other habitat types occurring in the project area, such as juniper woodlands.

Migratory bird species use the project area for nesting, foraging, and resting as they pass through on their yearly migrations; however, no formal monitoring for migratory birds has been conducted. Grassland and sagebrush associated species expected to be present seasonally include horned lark (*Eremophila alpestris*) and sage thrasher (*Oreoscoptes montanus*); woodland associated species found within the project boundary include gray flycatcher (*Empidonax wrightii*), dusky flycatcher (*Empidonax oberholseri*), dark-eyed junco (*Junco hyemalis*), and chipping sparrow (*Spizella passerina*). Birds of Conservation Concern for the Great Basin Region that may inhabit the Project Area include: Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), and loggerhead shrike (*Lanius ludovicianus*) (USFWS 2008). These species tend to select more sagebrush or shrubland type habitat, avoiding or reducing use in areas encroached by dense stands of juniper.

Large diameter or old growth juniper trees in the Project Area may support cavity nesting species, such as mountain bluebird (*Sialia currucoides*), northern flicker (*Colaptes auratus*), and American kestrel (*Falco sparverius*). Other species observed or expected to occur in the Project Area include American robin (*Turdus migratorius*), brown-headed cowbird (*Molothrus ater*), western meadowlark (*Sturnella neglecta*), and common raven (*Corvus corax*). In areas where juniper is in an intermediate stage of transition to woodlands, migratory bird diversity and richness is relatively high.

Currently there is one active northern goshawk nest within the project boundary, located approximately 500 feet from Alder Creek. Past thinning efforts have removed the encroaching juniper in the understory while promoting the existing Douglas fir trees.

Past and present actions and events influencing migratory birds include: wildfires, livestock grazing, fuels reduction and restoration treatments, road development, fence installation, and recreational activities.

3. Environmental Consequences

For the purposes of this analysis, the cumulative effects analysis area (CEAA) for migratory birds extends to the Crane Creek watershed and the parts of the Stinkingwater watershed overlapping with the Alder Creek Allotment. This area should encompass regular movements of migratory birds using the Project Area (when present). Existing vegetation communities in the Project Area are fairly representative of those across the CEAA, with the exception of riparian area and wet meadow on Alder Creek itself. Past and present actions and events, such as those described in Affected Environment, have influenced the existing environment within the CEAA. RFFAs in the CEAA contributing to cumulative effects to migratory birds and habitat include livestock grazing, hunting, and other recreational pursuits. Past actions affecting migratory birds or habitat in the CEAA are found in Table 3.

Alternatives analyzed in this document may incrementally affect migratory birds through disturbance and reductions of juniper trees. Disturbance related to the construction would be conducted outside of the critical nesting season. No nest abandonment is expected resulting from these proposed activities. Migratory birds may temporarily leave their roosting and feeding sites but this is expected to be temporary. The alternatives analyzed would not contribute to detectable cumulative effects to migratory birds.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Channel incision would continue depleting the ground water in the wet meadow and riparian area causing a transition of those systems from wetland and riparian to upland grass/shrub. Eventually, the upstream movement of the headcut would lead to the loss of the wet meadow and wetland habitat altogether. All of the above would remove the wet meadow habitat and much of the riparian corridor that numerous migratory bird species in the project area utilize. A loss of the wet meadow habitat and much of the riparian habitat would reduce migratory bird species richness in the project area.

EQUIPMENT ACCESS: Migratory birds would not be impacted because roads would not be improved nor would equipment be brought in to the project area.

CONSTRUCTION: There would be no construction related disturbances to migratory bird species or their habitat under this Alternative as construction activities would not occur.

GRAZING EXCLUSION OF WET MEADOW: Under this alternative, the 34-acre Alder Creek wet meadow would not be excluded from grazing. Livestock would continue to access the wet meadow during permitted use dates (May–July) every other year. There would be direct disturbance effects, including during nesting season, to migratory birds using the wet meadow area while livestock are in the pasture.

(2) JUNIPER TREATMENT

Plant communities would continue to transition toward juniper woodlands with a reduced herbaceous understory. Browse species (bitterbrush, big sagebrush, currant, and mahogany) would continue to decrease in quantity, health, and vigor. This would decrease habitat quality for numerous migratory bird species, especially the sagebrush obligate species utilizing these habitats (Miller et al., 2005). Juniper encroachment upon the riparian area would likely lead to diminished habitat conditions for migratory bird species that prefer riparian habitat as over time riparian species are outcompeted by encroaching juniper. Migratory bird species that prefer dense juniper woodlands would be favored under this alternative.

(3) WEED TREATMENT

With the No Action Alternative there would be no additional effects to migratory bird species from applying the additional available herbicides under this alternative. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative I - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: The Proposed Action would halt the upstream migration of the existing headcuts on Alder Creek. The wet meadow, as well as riparian habitats upstream of the small headcuts, would not undergo channel incision as described in the Riparian, Wetland, and Water Quality section. By stopping the degradation associated with channel incision, the wet meadow and upstream riparian corridor would continue to be available for migratory bird species to utilize.

Historic wet meadow habitat, now comprised mainly of upland species due to the incised channel below the headcuts, would be restored and returned to a wet meadow community under this alternative. Where bank sloping occurs upstream of the wet meadow, the active floodplain would widen creating more riparian habitat. All of the above, along with the riparian plantings outlined in the proposed action, would result in higher quality and an increased quantity of riparian and wet meadow habitat for migratory bird species utilizing these habitats.

EQUIPMENT ACCESS: Under this alternative, equipment would be mobilized to the project area and some impediments to travel would be removed from the access route. This type of spot removal and accessing the site would have some disturbance effects to migratory bird species on the way in and out of the project area. Migratory bird species would most likely flee the area of disturbance. This effect will be very short-lived and cease once equipment has moved on or out of the area.

CONSTRUCTION: Headcut restoration construction would have direct disturbance effects to migratory bird species in the immediate area. Construction activities would be outside of the nesting season. Most likely, most migratory bird species in the area near construction would flee the area during construction activities. This disturbance would be short-lived and cease once construction activities are finished.

GRAZING EXCLUSION OF WET MEADOW: Excluding grazing from the wet meadow would prevent livestock from accessing the meadow, eliminating all livestock/migratory bird disturbance including during nesting season in the wet meadow. There would be higher quality nesting cover for migratory bird species utilizing the wet meadow as a result of excluding livestock from the wet meadow.

(2) JUNIPER TREATMENT

Where junipers have developed into woodlands on mountain big sagebrush-bunchgrass and low/stiff sagebrush sites, migratory bird diversity and richness are relatively low. Juniper treatments in these areas would regenerate grasses and forbs. Shrubs, including sagebrush and bitterbrush, would also regenerate as a result of the juniper treatments, improving the quality and quantity of habitat for sagebrush obligate species such as sage thrasher and sage sparrow. As shrub and grass species regenerate, bird diversity and richness are likely to increase.

Removal of encroaching juniper from the wetland and riparian corridor would improve wetland and riparian conditions by removing the competing vegetation. The improved wetland and riparian conditions

would increase the quality and potentially even the quantity of habitat for migratory bird species utilizing these habitats.

Juniper treatments would reduce habitat quality and quantity for species that prefer woodland habitat, such as gray and dusky flycatchers. Birds nesting in cavities in old growth western juniper would be minimally affected as old growth trees would not be targeted for treatments. Although extensive juniper removal may displace or decrease the amount of habitat for species preferring woodland habitat, juniper expansion across the greater landscape area provides considerably more habitat for woodland species than historically existed.

Pile-burning would occur in the fall or winter, and might cause the few species wintering here to move into adjacent habitat during treatments, but these disturbances would be short-lived, ceasing once crews have completed the pile-burning.

(3) WEED TREATMENT

All weed treatments outlined in the Proposed Action will lessen the risk of the establishment of undesirable weed species or annual grasses. This, coupled with seeding a mix of desirable native and non-native grass species, should help maintain or improve habitat quality for migratory bird species in the project area. See Appendix C for detailed effects to migratory birds.

F. Identified Resource: Vegetation

1. Issue Questions

- Would using tracked vehicles damage upland vegetation?
- Would utilizing soils from vertical streambanks to re-contour sites result in vegetation loss?
- How would removal of encroached juniper affect existing plant communities?

2. Affected Environment

The ecological site descriptions for the area encompassing the Alder Creek Restoration projects include JD CLAYPAN 12-16 PZ (R010XB080OR) and SR MOUNTAIN NORTH 12-16 PZ (R010XC066OR). The reference plant community for the JD CLAYPAN is dominated by low sagebrush (*Artemisia arbuscula*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Sandbergs bluegrass (*Poa secunda*) and one spike oatgrass (*Danthonia unispicata*) are also common. Forbs include buckwheat (*Eriogonum sp*), serrate balsamroot (*Balsamorhiza serrata*), and phlox (*Phlox sp*).

This community is approximately 80 percent grasses, 8 percent forbs, and 12 percent shrubs (NRCS, 3/21/2014).

The plant community for SR MOUNTAIN NORTH is dominated by Idaho fescue (*Festuca idahoensis*) with mountain big sagebrush (*Artemisia tridentata vaseyana*) common. Bluebunch wheatgrass, wax currant (*Ribes sp*), and other shrubs are present. Yarrow (*Achillea millefolium*), milkvetch (*Astragalus sp*), arrowleaf balsamroot (*Balsamorhiza sagittata*), parsnipflower buckwheat (*Eriogonum heracleoides*), and lupine (*Lupin sp*) are the dominate forbs.

Juniper invasion is an issue with the site and is addressed in the Proposed Action. Invasive, noxious weeds are addressed in the weeds section of the EA, see Chapter III. 11. Noxious Weeds.

Possible disturbances having occurred in the allotment include, but are not limited to: effects from livestock grazing, juniper treatments, prescribed fire, vehicles, and recreation.

3. Environmental Consequences

The CEAA for upland vegetation is the Project Area and the areas directly adjacent to these areas, within 50 feet. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to the cumulative effects to upland vegetation include, but are not limited to, livestock grazing, juniper treatments, and recreational activities.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Under the No Action Alternative, there would be no repairing of headcuts along Alder Creek. Soil would continue to be eroded and washed away along the streambanks. Channel incision would continue moving upstream through the meadow, lowering the water table. As this occurred, the existing wetland vegetation would be converted from obligate wetland to facultative or obligate upland species. This would also occur upstream of the smaller headcuts, with a subsequent loss of riparian vegetation.

EQUIPMENT ACCESS: Roads would not be improved nor would materials be brought in or removed from the site. Vegetation would not be impacted by equipment accessing the site or performing restoration activities.

CONSTRUCTION: There would be no construction related effects to vegetation under this Alternative as rock and fine-grained soils would not be collected which would alleviate the need for off road travel.

GRAZING EXCLUSION OF WET MEADOW: Under the No Action alternative, livestock grazing would continue across the entire allotment. Standards and Guidelines would continue to be achieved following current grazing management.

(2) JUNIPER TREATMENT

Under the No Action alternative, there would be a continued increase of juniper cover and density in big sagebrush, low sagebrush, mountain mahogany, quaking aspen, and riparian areas. The increase in cover and density would further deplete the understory woody and herbaceous plant community. Reducing the understory vegetation would increase the amount of bare ground exposed to the forces of wind and rain. Erosion would increase on these sites. The reduction in understory vegetation would be most evident in areas dominated by big sagebrush having shallow soils or a restrictive layer within 18 inches of the soil surface (Miller, et al., 2001). In these areas, juniper and understory vegetation are forced to root in the same soil volume. Juniper is a much more effective competitor for resources and its roots would dominate the soil horizon. The effect is less dramatic on deeper soils. However, in deeper soils, juniper would still eliminate associated woody plants due to their similar rooting patterns and the ability of juniper to better compete for available resources. Under these conditions, shrubs would be eliminated from the plant community before herbaceous vegetation.
In most cases, the influence of juniper is limited to areas directly below the trees. Low sagebrush sites may also contain very old trees. The low fire return interval of these sites allows juniper to establish and grow to a very old age (greater than 500 years). The increase in juniper on these sites increases the risk of widespread, high-intensity fires which can kill old-growth trees.

Juniper would continue to increase in more productive quaking aspen and riparian areas, eventually approaching full canopy closure on some sites. A combination of intense competition for resources and heavy needle fall would eventually reduce quantities of the understory herbaceous and woody plants. Establishment of juniper alters the vegetation and fuel structure of these areas. A shift to coniferous vegetation from broadleaves increases the fuel continuity and changes the fuel chemical composition. Dense juniper stands would increase the likelihood of high-intensity/severity fires in these areas.

Areas where juniper has been previously cut would be at risk of burning in wildfires. If this occurs, the high fuel accumulations would result in a heat pulse to the soil surface and risk of volatilization of soil nutrients and alteration of soil structure. If fires do occur on these sites, the fires would produce spots of bare soil open for invasion by introduced annual plants.

(3) WEED TREATMENT

Weed treatments and monitoring would continue as outlined in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: This alternative would stabilize the existing headcuts along Alder Creek, thus arresting their upstream migration. Wet meadow and riparian habitats upstream of the headcuts would be preserved. A ponded area would be created within the incised wet meadow channel allowing for slow capture of sediment eventually resulting in a lower depth to groundwater in areas already converted to dry/upland meadow. Lowering the depth to groundwater would allow re-establishment of wetland obligate or facultative plants and eventually recover the wetland acreage lost to channel incision.

Installation of two cattleguards would have no measurable impacts to upland vegetation because the areas required would be small and located in places where the vegetation is already disturbed.
Maintenance on structures would have no measurable impacts to vegetation as it would occur when upland vegetation is dormant (perennials) or dead (annuals).

EQUIPMENT ACCESS: Removing large rocks within the roadbed to allow equipment access to the wet meadow would not impact upland vegetation since all work would be performed within the current road bed and increasing the road width is not part of the Proposed Action. Removal of juniper along the roadside would have the same effect.

CONSTRUCTION: As part of the Wet Meadow restoration, there would be approximately 340 cubic yards of fine-grained soils removed from (at this time) non-specified vertical streambank sites for placement within the roughened channel section. Once fine-grained soils are removed, the vertical streambanks would be re-contoured and re-vegetated, facilitating the recovery to pre-cutbank vegetative conditions. Heavy equipment would be utilized to access and remove the fine-grained soils and large

rock and may impact upland vegetation. Utilizing the same route would minimize the overall area of impact. Because the project work would be expected to occur between October and November, impacts to upland vegetation would be non-measurable since most vegetation would be dormant or have already reached seed set and have senesced. The impact to remaining vegetation at the site would be less due to tracked machines distributing the weight of the machine and load over steel or rubber tracks resulting in lower ground pressures than other equipment (Blinn, Dahlman, Hislop, and Thompson, 1998). Impacts would be further minimized by performing work when soils are the least saturated.

Where junipers with root wads attached are removed, the holes would be re-contoured and seeded which would prevent soil loss and the establishment of noxious and/or invasive weed species.

GRAZING EXCLUSION OF WET MEADOW: Under the Proposed Action, livestock would be excluded from the wet meadow and adjacent toe-slopes. See Riparian, Wetland, and Water Quality section for discussion of effects to Riparian Vegetation.

Resting the Alder Creek Pasture from livestock grazing for one growing season post completion would facilitate the re-establishment of seeded areas by preventing livestock from accessing new growth.

(2) JUNIPER TREATMENT

The Proposed Action addresses encroached juniper within the Alder Creek Pasture. The effects of these actions on upland vegetation would be as follows:
Low Sagebrush-bunchgrass

The majority of juniper found on low sagebrush-bunchgrass sites have established over the last 110 to 130 years. Removal of these trees would help to reestablish appropriate sagebrush plant communities. Cutting juniper would help to increase soil resources (water and nutrients) for residual grasses, forbs, and shrubs. These sites would not be priority treatment areas under the Proposed Action.

Mountain big sagebrush-bunchgrass

Juniper has increased considerably in Mountain Big Sagebrush plant communities. Cutting encroached juniper, followed by piling has proven to be an effective method to balance short term plant community restoration and fire management concerns. It is conducive to maintaining the shrub component on the site. Burned pile acreage would depend on precutting density, cover, and average tree size. Mountain Big Sagebrush

sites with mountain mahogany or bitterbrush would be priority treatment areas under the Proposed Action.

Quaking Aspen

Juniper encroachment into quaking aspen stands is exacerbating the general decline of quaking aspen documented across the western United States (Wall, Miller, and Svejcar, 1999). Removing juniper would help increase the amount of soil moisture and nutrients available to residual quaking aspen and understory plants. Suckering would be encouraged by some physical damage caused by juniper felling and pile burning. Trees may knock over or severely damage some standing quaking aspen. This damage would help to facilitate the suckering of quaking aspen. However, resources released by cutting juniper would also be available for small juniper occurring in the understory. Miller and Rose (1995) found up to 1,400 western juniper seedlings per acre in the understory of quaking aspen stands on the Steens Mountain. Cutting and piling would offer only a short term (15-20 year) solution to juniper encroachment. Eventually, these stands would need to be cut and piled again. This community type is considered a priority area for treatment under the Proposed Action.

Riparian Areas

Cutting and piling or girdling would be used in areas where juniper woodlands exist in or adjacent to riparian areas. Piling would minimize effects of fire on desirable riparian shrubs. Girdling would eliminate the need for piling and burning. Most species occupying riparian areas are capable of sprouting following removal of the top growth. Fire creeping from burn piles may remove old plant material from woody riparian species and help facilitate sprouting. Sprouting of willows and alders may be vigorous following burning. Cutting or girdling of juniper without follow-up broadcast burning would result in numerous juniper seedlings being released. The site would benefit from future follow up treatments to remove these juniper seedlings. This community type is considered a priority area for treatment under the Proposed Action.

In all community types where juniper would be cut, piled and burned, reseeding would occur to prevent future soil loss by re-vegetating the site with a desired seed mix, also preventing the establishment of non-native, invasive species.

(3) WEED TREATMENT

Weed treatments may impact upland vegetation, mainly annual forbs; however, utilization of the best available chemicals, paired with the correct timing and rate would minimize impacts. Treating noxious weeds

with additional herbicides would benefit upland vegetation by allowing the most effective chemical weed treatments in areas of existing and future vegetation disturbance. Treating noxious weeds in these areas would promote and maintain the abundance of desired vegetation. Specific effects by chemical can be found in Appendix C.

G. Identified Resource: Forestry and Woodlands

1. Issue Question

- Would either alternative restore the project area to its pre-settlement structure of open woodland?

2. Affected Environment

Western juniper found in modern woodland communities, such as those found within the Project Area, are in denser populations than historically found prior to the westward expansion of the late 1800's. Prior to the 1860's western juniper would typically be found as open savannas with an abundance of sagebrush, grass, and mountain mahogany communities. Woodlands, in their current state, are comprised of three phases of juniper (see Table 4) mixed with a declining sagebrush/grass, or mountain mahogany community. Junipers found in the Project Area are generally less than 100 years old. Trees less than 100 years old have become established due to past fire suppression policies, climatic changes, and increased human activity and are considered to be more common than the most recent historical stocking levels (Miller et al., 2005). Historically, juniper were typically found on rocky ridges, low sagebrush flats, and pumice type soils. These sites are zones where fires typically carry low flame lengths due to vegetation

cover containing few or no fine fuels or areas so rocky other vegetation and fine fuels do not exist (Miller et al., 2005).

Past projects completed in the proposed area are as follows: sixteen juniper removal projects and three projects of pre-commercial thinning with juniper removal in a Douglas-fir stand. All 19 projects occurred between 1994 and 2010, and totaled 701 acres. The Douglas-fir stand is 90 acres and is the only other species of conifer found in the Project Area. Western juniper is classified into three phases. Table 4 shows the variation between phases and the number of acres per phase in the proposed project.

Table 4. Juniper Transition Phase by acres in the Project Area

Characteristics Post-settlement Stands	Phase I (early)	Phase II (mid)	Phase III (Late)
Tree Canopy:	Open, actively expanding <10%	Actively expanding 10 to 30%	Expansion nearly stabilized >30%
Crown Lift:	Absent	Absent	Lower limbs dying or dead where tree canopy >40%
Tree Recruitment:	Active	Active	Limited
Shrub Layer:	Intact	Nearly intact to significant thinning	>75% dead
Approx. Acres in project area:	1,894	4,134	1,069

3. Environmental Consequences

The Cumulative Effects Analysis Area (CEAA) for forestry and woodlands is within the proposed Project Area of Alder Creek pasture. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to forestry and woodlands would be due to increased juniper densities on the landscape and loss of old growth juniper structure due to uncharacteristic wildfire behavior and resource competition.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Under this alternative, channel incision would continue moving upstream through the meadow, lowering the water table. As this occurs, the existing wetland vegetation would be converted from obligate wetland to facultative or obligate upland species. Juniper woodlands could then expand into these drier sites.

EQUIPMENT ACCESS: Western juniper would not have to be removed nor limbed to allow equipment to pass. Therefore, there would be no equipment effects to individual juniper trees.

CONSTRUCTION: No juniper would be used to stabilize banks or add woody material to the stream channel. Therefore, there would be no construction related effects to individual juniper trees.

GRAZING EXCLUSION OF WET MEADOW: Not excluding the Wet Meadow would have no effect on Woodlands because current grazing levels are not a causal factor for woodland expansion. Burkhardt and Tisdale (1976) found little relationship between range condition of big sagebrush-grass stands and the rate of juniper invasion. Invasion of juniper into big sagebrush communities appears to be directly related to the cessation of periodic fires (Burkhardt and Tisdale, 1976).

(2) JUNIPER TREATMENT

UNDER THE NO ACTION ALTERNATIVE: Under the No Action alternative western juniper expansion would continue. Western juniper would continue increasing in density on the 7,187 acre allotment. The 6028 acres of Phase 1 & II stands would transition to Phase III. Phase III stands are more fire resistant due to the elevated canopy and lack of grasses, forbs, and shrubs to carry the fire. However, depending on climatic conditions and phase of juniper stand, wild land fire has the potential of returning this site to pre-settlement conditions.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to Woodlands. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Headcut restoration activities would have no measurable effect on juniper woodlands. Individual juniper trees would be used for the headcut restoration but would only amount to approximately 1000 square feet of trees (approximately 60 to 100 trees), which is an inconsequential amount in relation to the amount of juniper across the landscape.

EQUIPMENT ACCESS: Equipment access would have no measurable effect on juniper woodlands. Individual juniper trees growing so close to the access route as to prevent equipment movement would be cleared from the roads edge. The number of trees to be moved is inconsequential in relation to the amount of juniper across the landscape.

CONSTRUCTION: Construction activities would have no measurable effect on juniper woodlands. Individual juniper trees would be used to create a temporary stream crossing, however, the number of trees to be used is inconsequential in relation to the amount of juniper across the landscape.

GRAZING EXCLUSION OF WET MEADOW: Grazing exclusion would have no effect on woodlands because current grazing levels are not a causal factor for woodland expansion. Burkhardt and Tisdale (1976) found little relationship between range condition of big sagebrush-grass stands and the rate of juniper invasion. Invasion of juniper into big sagebrush communities appears to be directly related to the cessation of periodic fires (Burkhardt and Tisdale, 1976).

(2) JUNIPER TREATMENT

The proposed action would move the project area toward a functioning ecosystem by reducing competition for resources in a semi-arid region. Moisture ranges from 8 to 12 inches primarily from snow pack and light early and late rain fall. Historically, prior to European settlement, fire intervals were common (8 years) depending on climatic conditions (Miller and Rose 1999, pp. 554,555). As juniper woodland increases in stems per acre fire becomes less likely to carry through (Miller et al., 2005). Phase I juniper woodland is an open savanna with junipers scattered throughout (less than 10 percent canopy cover) tall grasses and sage brush component. Fire carries through this phase easily due to the abundance of grasses and sage brush. Fuels from sagebrush and grass, along with the summertime dry conditions, cause mortality in these junipers. Phase II has 10 to 30 percent juniper canopy cover on the landscape and lighter (40 to 60 percent) coverage of grasses and forbs due to the increase in canopy cover. Fire still has enough fuel in the form of dead or dying sage brush, grasses, and dry summer conditions to cause pre-drying of the juniper. Mortality caused by fire removes 90 to 100 percent of the crown, eliminating photosynthesis. Phase III, canopy cover exceeds 30 percent, juniper recruitment is low, lower limbs are dead and absence of shrub and grass layers is greater than 75 percent (mortality caused by competition for resources). Fire is typically stopped by phase III junipers stands. The primary reason for this is the absences of fine fuels, grass, and shrub component to carry a fire. A reduction of juniper woodlands established in the past 120 years would increase sagebrush and grass communities within the Project Area (Miller et al., 2005), thus placing the juniper stands in a phase I condition. Old growth juniper would be retained where found, typically in shallow and rocky soils where the absence of grasses and shrubs is greater than 75 percent: They are generally found along rim rock or rock outcrops. Junipers that exhibit cavity nesting would be retained for the wild life values. Examples of Phase I and Phase II juniper being

affected by a naturally occurring fire are two miles east of the project area. Approximately 87,000 acres were burned because of two years of higher than normal spring precipitation that enhanced grass and shrub growth with an early drying period. Within the Buzzard complex fire, acres where Phase III occurred suffered mortality in the outer edges of the juniper stand but 80 to 90 percent were left untouched.

(3) WEED TREATMENT

With applications of herbicides in pile burned areas followed by seeding with suggested seed mix, grasses and forbs would be increased. This would enhance Phase I and Phase II woodlands by eliminating bare spots in well-drained soils and creating better conditions for fire to carry through the treated area. Frequent fire intervals maintain juniper woodlands in a pre-settlement condition (Miller and Rose 1999, p. 551).

H. Identified Resource: Air Quality

1. Issue Questions

- What are the air quality concerns associated with pile burning?
- Would air quality in Harney County or the Strawberry Wilderness be affected?

2. Affected Environment

Current discussion and analysis of effects on air quality resource(s) are tiered to the Three Rivers PRMP/FEIS, and contained in the following section: Sections 3-2.
Air quality in the area associated with all the analysis areas is generally good. No area or community in Harney County is considered a non-attainment area for particulate matter, meaning they are not in violation of the particulate (PM 2.5) national ambient air quality standard.

Weather, as illustrated by wind, moves into the Project Area generally from the west or southwest and exits the Project Area to the east or northeast. Periods of degraded air quality can occur though typically these events are short lived (less than one day). These events are typically associated with development of a stable air mass and/or cold air inversion over the Project Area. Smoke from wildfires and, to a lesser degree, prescribed fires is also a cause of degraded air quality when the fires occur, primarily from particulate matter contained in smoke.

The Strawberry Mountain Wilderness Area, an area designated as a Federal Class 1 airshed under the Clean Air Act (42 U.S.C. § 7475 [d][2][B]), is located approximately 40 air miles north of the Project Area. Designation as a Class 1 airshed allows only very small increments of new pollution above existing air pollution levels. These increments are variable, and defined in the Operational

Guidance for the Oregon Smoke Management Program: see http://www.oregon.gov/ODF/FIRE/SMP/SMD.pdf.

3. Environmental Consequences

The CEAA for Air Quality is the Alder Creek Pasture, Harney County, and the Strawberry Mountain Wilderness. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to Air Quality include prescribed burning and wildfires.

Other prescribed fire projects and mechanical fuel reduction projects are, or would be planned, for the Three Rivers Resource Area. Other prescribed fire projects and mechanical fuel reduction projects are, or would be planned, for the adjacent Malheur National Forest. While the cumulative effect may be impacted air quality, the impact would be short lived, lasting anywhere from a few hours to a few days.

Prescribed fire projects implemented by other land management agencies or private parties are possible. These impacts again would be short lived (a few hours to a few days), focusing on the time of project implementation to a few days post treatment.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION:

MEADOW AND SMALL HEADCUT RESTORATION: There is no cause-effect relationship between channel degradation and air quality. Therefore, there would be no effect to air quality from not restoring the headcuts.

EQUIPMENT ACCESS: There would be no measureable effect to Air Quality from not moving juniper and boulders from the access route.

CONSTRUCTION: There would be no construction related effects to air quality from the No Action Alternative.

GRAZING EXCLUSION OF WET MEADOW: There is no cause-effect relationship between excluding the wet meadow and air quality. Therefore, there would be no effect to air quality from not excluding the wet meadow from livestock grazing.

(2) JUNIPER TREATMENT

Under the No Action Alternative, fuel treatments would not occur. Ongoing actions within the Project Area would not impact air quality or

contribute particulate matter (PM 2.5) to the airshed. However, the potential for subsequent wildfires that would produce significant quantities of PM 2.5 would continue to increase as surface and ladder fuels accumulate in the Project Area. The impact to air quality would be greater from a wildfire occurring in the area as wildfires typically burn longer, consume more of the burnable biomass, and produce more smoke and particulate matter than pile burning (pile burning occurs when ground is frozen or moist to prevent spread and so surrounding vegetation is not consumed).

(3) WEED TREATMENT

Weed treatments and monitoring would continue as outlined in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: There is no measurable relationship between headcut restoration and air quality.

Therefore, there would be no effect to air quality from the restoration of the current headcuts.

EQUIPMENT ACCESS: There would be no measureable impact to air quality from access route activities.

CONSTRUCTION: Impacts to air quality from construction would be from dust reducing visibility in the immediate Project Area. Impacts would cease when such operations stop. The areas of greatest impact from construction activities would be the immediate vicinity (within 50 feet) of the machine while in operation. These effects would only occur when machinery is moving outside of the wetland. There would be no dust related effects to air quality when equipment is working on wet soils.

Emissions from diesel equipment used during construction would incrementally contribute to reduced air quality. However, the project area and larger CEAA are not in an Oregon Department of Environmental Quality Non-Attainment Area or Maintenance Area for Air Quality. See Chapter 1.D.2. Issues Considered but Eliminated from detailed analysis - Greenhouse Gas Emissions and Climate Change for further discussion.

GRAZING EXCLUSION OF WET MEADOW: There is no measureable relationship between excluding the wet meadow and air quality. Therefore, there would be no effect to air quality from the proposed wet meadow exclosure.

(2) JUNIPER TREATMENT

The Proposed Action would produce smoke from slash pile burning and, to a lesser degree, dust from mechanical (cutting and piling) treatments. Impacts to air quality from pile burning could range from reduced visibility to pneumonic irritation and smoke odor when treatments occur. These impacts are short-lived with the greatest impact occurring during the actual ignition phase and lasting from one to a few days depending on the size and number of actual burn units or piles to be ignited. Residual smoke produced from smoldering logs after the piles are consumed could occur; this would last for one or two days following the ignition phase.

The areas of impact from smoke caused by pile burning would be those areas downwind and down-drainage from the Project Area and campsites and various roads in the Stinkingwater Mountains. A wind vector analysis and review of topographic features indicated these areas are typically east, southeast, and northeast, respectively, of the Project Area. Pile burning is planned and implemented when atmospheric stability and wind conditions promote smoke dispersion into the atmosphere and/or transport out of the

area. These conditions are outlined in the Daily Oregon Smoke Management Instructions and are available at: http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/Daily/neo.htm.

Impacts to air quality from mechanical treatments would be dust and reduced visibility in the immediate Project Area, ceasing quickly when such operations stop. The areas of greatest impact from mechanical treatments would be the immediate vicinity (within 50 feet) of the machine while in operation.

The Strawberry Mountain Wilderness is not expected to be impacted by this project due to the remote distance and planned smoke dispersion.

(3) WEED TREATMENT

There would be no impact to air quality from the proposed weed treatments.

I. Identified Resource: Fire Management

1. Issue Question

- How is fire management affected by either the No Action Alternative or the Proposed Action?

2. Affected Environment

Condition Class:
A Condition Class analysis was conducted for the Project Area. The Condition Class is a measurement used to determine how departed a geographic unit or plant community is from its historical fire regime or plant community structure. A Condition Class 1 represents an area where composition and structure of vegetation and fuels are similar to the natural (historic) regime; the risk of loss of key ecosystem components is low. A Condition Class 2 represents an area where composition and structure of vegetation and fuel are moderately altered from the natural regime; the risk of loss of key ecosystem components is moderate. A Condition Class 3 represents an area where composition and structure of vegetation and fuel are highly altered from the natural regime; the risk of loss of key ecosystem components is high.

Approximately 4500 acres of the Project Area can be described as Condition Class 2. Approximately 363 acres have had juniper cut and leave treatments and are in Condition Class 3. The remainder is in Condition Class 1.

Fire Regime:
A fire regime is the pattern, frequency, and intensity of the wildfires that prevail in an area.

The mountain big sagebrush plant communities are classified as a high severity fire regime (FR). Historically, fires burned through this plant community once every 35 to 50 years (FRs II and III), usually consuming most to all available fuels. These plant communities in their current condition account for approximately 50 percent of the Project Area.

The remaining 50 percent of the Project Area consists of low sagebrush plant communities which historically had longer periods of time between fire events. The low fuel accumulations did not permit fires to burn across these plant communities unless conditions were severe. These conditions occurred once every 150 to 200 years (FR V). Fires in low sagebrush plant communities created a mosaic of burn severity. There were patches of lightly burned areas as well as heavily burned areas. In the lightly burned areas, only the fine fuels, grasses, and forbs were burned. In the high severity areas all vegetation was consumed.

Alder Creek Pasture is heavily encroached by juniper of all size classes due to fire suppression altering the historical fire return intervals. In the event of wildfire, a surface fire in grasses and shrubs can tend to transition into a canopy fire in the juniper. This makes a fire much more resistant to control, and firefighter safety can be compromised.

Approximately 363 acres of the juniper/mahogany woodlands have had juniper cut and leave treatments in the past. The result of these treatments is dense dead juniper tangled in live mahogany and sagebrush. Much of this lies along roads which would be used for containment in the event of wildfire. A wildfire in these areas would be of high severity, resistant to control, and firefighter safety would be compromised.

3. Environmental Consequences

The CEAA for Fire Management is the Alder Creek Pasture. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to Fire Management include cutting and piling encroached juniper, recreation, and continued livestock grazing.

a. Alternative I - No Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: As described in the Riparian, Wetland, and Water Quality Section, this alternative would result in the loss of meadow and riparian habitat due to channel incision. Currently, the meadow and riparian habitat offer an important landscape feature for suppression efforts in the event of a wildfire. The capacity for the wet meadow to serve as a safety zone or anchor point for control lines would be lost as channel incision moves upstream.

EQUIPMENT ACCESS: There would be no change to the access route under this alternative. Access along the route for large, heavy equipment, including Fire Engines, would be difficult.

CONSTRUCTION: There would be no construction related effects to fire management from either the No Action Alternative or the Proposed Action.

GRAZING EXCLUSION OF WET MEADOW: There would be no effect to fire management from not excluding the wet meadow from grazing. While there would be less fine fuels in the 100 acres surrounding the wet meadow under this Alternative as compared to the Proposed Action, this amount would be inconsequential to fire suppression efforts.

(2) JUNIPER TREATMENT

Fuel loadings would not be reduced and fire would not be reintroduced under the No Action Alternative. Rangeland plant communities would continue on a predicted successional transition to fully-developed juniper woodlands (Miller and Rose, 2000).

In areas being encroached upon by western juniper, risk of a high severity fire increases because of increased continuity of crown fuels. Fires under crown fire conditions have potential to burn large areas and are difficult to suppress. Suppression actions under these conditions would rely primarily on indirect attack. This suppression tactic relies on line constructed (hand, dozer, etc.) or existing features (roads, streams etc.) at some distance from the fire and unburned fuel between the fire line and flaming front is burned. This tactic increases the area burned. Accumulation of fuels would also require a greater mop-up effort following control of wildfire. Overall, all units would largely remain in a Condition Class 2 or 3 where the risk of large-scale, high-intensity wildfires and negative effects to human life and the environment reach their maximum.

(3) WEED TREATMENT

Weed treatments and monitoring would continue as outlined in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: The proposed headcut restorations would maintain and slightly increase green, wet acreage in the CEAA. During a wildfire, this site would be an important safety zone for firefighters. Retaining this feature on the landscape would improve firefighter suppression efforts by providing a solid anchor point for control lines.

EQUIPMENT ACCESS: Spot removal of impediments to travel (i.e. juniper and boulders) should assist fire engine and other suppression equipment use/access of the road.

CONSTRUCTION: Construction activities would occur during the fall and therefore would not have any effect on Fire Management.

GRAZING EXCLUSION OF WET MEADOW: Grazing exclusion of approximately 100 acres would have no effect on Fire Management on the landscape. However, fine fuels would be greater inside the exclosure and fire effects (increased mortality) on those plants would likely be greater if a wildfire were to occur.

(2) JUNIPER TREATMENT

The Proposed Action would reduce intensity and severity of wildfires and risk to firefighters by altering the continuity of fuels in the Project Area. Suppression actions would be able to employ more direct attack strategies minimizing acres burned in wildfires. Firefighters could rely more on natural fuel breaks and changes in fuels. Less fire line might need to be constructed to suppress wildfires.

Removing encroaching juniper (in addition to reducing fire spread) should, over time, allow the suite of grasses and shrubs to occupy each unit more in line with their natural range of variability. This should promote a more natural role of fire interacting with the resident flora.

Implementation of the Proposed Action would lower the risk of a large-scale, high-intensity wildfire event occurring. The overall Fire Regime Condition Class (FRCC) rating would change from a Condition Class 3 or 2 to Condition Class 2 or 1 as open, early-seral shrub lands increase across the landscape and juniper woodland stands are treated. The Proposed Action would meet the National Fire Plan goal of moving portions of the Project Area into a Condition Class 1.

(3) WEED TREATMENT

The proposed weed treatments should lower the risk of large-scale wildfires by reducing the invasive annual grasses in the project area.

J. Identified Resource: Noxious Weeds

1. Issue Questions

- What impacts would the Proposed Action have on noxious weed introduction and spread?
- How would noxious weeds be treated?

2. Affected Environment

A number of noxious weeds have been documented in the Project Area. Canada and bull thistle are present on the dry terraces and in the wet meadow areas immediately adjacent to Alder Creek; 67 acres in this area have been identified with scattered patches of each of these species.

There are a number of weed infestations documented within a 0.5 mile radius of this Project Area, totaling approximately 13 acres. These weed species include: Canada thistle, bull thistle, medusahead rye, and Ventenata dubia.

Along Travel Route A are a number of infestations of whitetop as well as numerous scattered patches of Canada, Scotch, and bull thistle. Additionally, there are several hundred acres of medusahead rye within the Project Area but to the west of Alder Creek meadow. These infestations have not been mapped but are known to occur.

Treatments in the Alder Creek Meadow area have occurred as follows:

2011 - 5.5 acres
2009 - 0.6 acres
2008 - 0.6 acres

These treatments were specifically for Canada and bull thistle infestations near the meadow. The Medusahead site on the road coming down to the creek from the east was also treated.

3. Environmental Consequences

The CEAA for noxious weeds is the Alder Creek allotment. Weeds in the allotment may influence the level of introductions of new weed sites into the Project Area. Conversely, spread of weeds from the Project Area (Alder Creek Pasture) could impact the entire allotment. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to noxious weeds include future aggressive treatments of medusahead rye and other problematic weeds including Canada, bull, and Scotch thistles. In addition, juniper expansion and wildfire events would continue to

create expanses of modified habitat susceptible to invasion by noxious weeds. Ground disturbing activities have the potential to create opportunities for new weed introductions or spread. Following Project Design Features and monitoring for at least two years post-project completion should reduce that likelihood to minimal levels.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Continued headcutting of the stream channel and the poor vegetation associated with it would occur under this alternative. This would continue to support noxious weeds rather than desirable vegetation.

EQUIPMENT ACCESS: Under the No Action alternative there would be no short-term disturbances from Equipment Access activities, thereby reducing new weed introduction opportunities.

CONSTRUCTION: Under the No Action alternative there would be no short-term disturbances from construction activities, thereby reducing new weed introduction opportunities.

GRAZING EXCLUSION OF WET MEADOW: Under the No Action Alternative there would be no change to grazing within or adjacent to the Wet Meadow. Therefore exclusion would have no effect on noxious weed spread or introduction.

(2) JUNIPER TREATMENT

Under the No Action alternative, there would also be an increased risk of noxious weed invasion, or expansion of existing populations, in the Project Area as risks of a large-scale wildland fire increase. Understory plants within big sagebrush plant communities would continue to decline from juniper encroachment. Wildfires occurring in juniper woodlands less than 130 years old tend to be severe enough to kill 50 to 100 percent of understory plants. These conditions are conducive to noxious weed invasion.

(3) WEED TREATMENT

Under the No Action Alternative, the Burns District would continue to treat using the herbicides allowed under the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05). These herbicides are not particularly effective for Canada thistle control and are much

harsher on the associated desirable species. They are not at all effective on the invasive annual grasses, which would continue to spread unchecked.

b. Alternative II - Proposed Action

The Proposed Action, including mitigations for preventing noxious weed spread, should enhance the overall health of plant communities in the Project Area. Healthy plant communities would help minimize noxious weed introduction and spread.

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: The Proposed Action should have the effect of raising the water table in the meadow, reducing the areas of dry, unstable benches, and encouraging sustainable riparian vegetation communities along the creek. This competitive vegetation would do a much better job of occupying niches and reducing opportunities for noxious weed establishment and spread.

EQUIPMENT ACCESS: Following the Project Design Features outlined for the Proposed Action should reduce opportunities for noxious weed establishment and spread.

CONSTRUCTION: Following the Project Design Features outlined for the Proposed Action should reduce opportunities for noxious weed establishment and spread.

GRAZING EXCLUSION OF WET MEADOW: The Proposed Action should encouraging sustainable riparian vegetation communities along the creek. This competitive vegetation would do a much better job of occupying niches and reducing opportunities for noxious weed establishment and spread. Excluding livestock from the meadow will also reduce opportunities for new weed introductions.

(2) JUNIPER TREATMENT

Treating junipers and treating any noxious weeds that show up in the burned pile areas, followed by seeding with competitive species should reduce opportunities for noxious weed establishment and spread. Landscapes with junipers removed are able to maintain viable, productive vegetative communities which can compete with weeds more effectively for resources.

(3) WEED TREATMENT

Herbicide treatments to address the weed infestations in the Project Area

would be the most effective method for treating medusahead and other annual grasses as well as any infestations of the problematic, biennial and perennial thistles and mustards.

The Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD October 2010 (Oregon Veg. ROD), Vegetation Treatments on BLM Lands in 17 Western States ROD September 2007 (National Veg. ROD), and the March 1, 2011 Order Amending Injunction (Case No. 83-cv-6272-AA [US District Court]) provide new information to enable BLM districts in Oregon to utilize 13 new active ingredients for the treatment of noxious weeds, in addition to the 4 active ingredients currently available (2,4-D, dicamba, glyphosate, and picloram) under the Burns District's Noxious Weed Management Program EA (OR-020-98-05).

Under the Proposed Action, herbicide treatments within the Project Area could include the currently available herbicides plus the following new products: Plateau (Imazapic), Telar XP (chlorsulfuron), and Transline (clopyralid). The product(s) to be used on individual infestations would be determined based on weed species, phenology, the type of location, status of desirable vegetation present, and environmental conditions.

A discussion of the three new products follows:

Imazapic: Imazapic (specifically Plateau) is currently the best choice for the treatment of medusahead rye in Burns District. The Ecological Risk Assessments for Imazapic can be found in the Vegetation Treatments Using Herbicides on BLM Lands in Oregon Final Environmental Impact Statement (FEIS), July 2010 (Oregon Veg. FEIS), Table 3-12 (Volume 1. p. 94) and Table 3-14 (Volume 1, pp. 96-97). The Ecological Risk Assessments for Imazapic can also be found in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States FEIS, June 2007 (National Veg. FEIS) (pp. C-26, 32, 49, 69, and 70). They are summarized in this EA in Appendix C. All applicable

Standard Operating Procedures (SOP) and Mitigating Measures from the Oregon Veg. ROD (pp. 33-45) would be incorporated.

Plateau applied in the fall at 6 ounces per acre (0.178125 pound per acre of active ingredient Imazapic) just below the maximum rate of 0.1875 pound per acre analyzed by the Oregon Veg. FEIS (CH 3, pp. 60) and National Veg. FEIS was selected to treat medusahead rye, because it has effective short-term residual control on this noxious weed. Additionally there would be low risk to perennial non-target vegetation during fall treatments at a rate of 6 ounces per acre (Davies 2010).

Imazapic would have moderate risk to no risk to the health of upland vegetation (National Veg. FEIS, pp. 4-49 & 53). Applications of 6 ounces per acre would be below the maximum rate authorized to treat infested sites (Oregon Veg. FEIS). Risk to the health of terrestrial and special status plants at this application rate from direct spray would have moderate risk, off-site drift low risk (special status species [SSS] plants) and no risk (terrestrial), surface runoff no risk, and wind erosion no risk. However, it has been observed in the fall, applications with 6 ounces per acre Imazapic would further reduce the risk from moderate to low from direct spray on non-target plant species because these plants are dormant (Davies, 2010; Davies and Sheley, 2011). Imazapic would reduce medusahead rye and allow existing native and seeded native and non-natives the opportunity to compete for available resources such as water, nitrogen, and other nutrients, and to regrow or establish.

Chlorsulfuron: The Ecological Risk Assessments for Chlorsulfuron can be found in the Oregon Veg. FEIS Table 3-12 (Volume 1, pp. 94) and Table 3-14 (Volume 1, pp. 96-97). The Ecological Risk Assessments for Chlorsulfuron can also be found in the National Veg. FEIS (pp. C-23,30,39, 59, and 60). They are summarized in this EA in Appendix C. All applicable SOPs and Mitigating Measures from the Oregon Veg. ROD (Attachment A, pp. 33-45) would be incorporated.

Chlorsulfuron (specifically Telar XP) is one of the most effective herbicides available for treatment of whitetop and perennial pepperweed. It is also very effective on thistles. Effectiveness at more diverse phenologic windows can be enhanced when included as part of a tank-mix with either 2,4-D, picloram, or clopyralid to treat thistles. Typical application rate for this product is 1.3 ounces per acre (0.035 pound active ingredient [ai] per acre). Risk to the health of terrestrial and SSS plants at this application rate from direct spray would be high , off-site drift low risk (SSS plants), low risk to birds and mammals, slight risk to fish, and very low risk to terrestrial invertebrates, surface runoff, and wind erosion. Chlorsulfuron is used at very low pounds of active ingredient per acre. Efficacy on the mustards (whitetop and pepperweed) is vastly superior to 2,4-D or dicamba. When included in a tank mix with very low rates of either 2,4-D (0.5–1 quart per acre), picloram (one pint per acre), or clopyralid (0.5 pint per acre), herbicide efficacy is enhanced over much broader phenological stages of the target weeds using greatly reduced pounds of active ingredient per acre.

Clopyralid: The Ecological Risk Assessments for Clopyralid can be found in the Oregon Veg. FEIS, Table 3-13 (Volume 1, p. 95) and Table 3-15 (Volume 1, pp. 98-99). They are summarized in this EA in Appendix C. All applicable SOPs and Mitigating Measures from the Oregon Veg. ROD (pp. 33-45) would be incorporated.

Clopyralid (specifically Transline) typically applied at 1 to 1-1/3 pints per acre (0.375 to 0.5 pound ai per acre) can be a very effective herbicide for treating knapweeds and thistles, especially Canada thistle, with much less non-target damage to desirable trees, shrubs, and forbs than picloram, particularly when applied in the fall. It can be added to tank mixes with Chlorsulfuron or 2,4-D and enhance efficacy over a broader array of phenological stages for treatment of target weeds. Risk to the health of susceptible terrestrial and SSS plants at this application rate from direct spray would be high, off-site drift low risk (SSS plants) and no risk (terrestrial), and surface runoff no risk.

In the Burns District, as part of standard operating procedures for the Weeds Program, Project Areas where ground disturbance occurs are monitored for at least two years post-project completion. Weeds found are treated using the most appropriate methods. Treatment areas are monitored annually to document efficacy and determine additional treatment needs. Where herbicide treatments are necessary, using these new products either alone or in combination with our currently available products would provide us the best tools available to ensure effective, timely management of noxious weeds in this area. By controlling noxious weeds, we enhance the success of rehabilitation of the Project Area following the disturbances from the proposed project.

By following the Project Design Features, the likelihood of new weed introductions would be minimized because equipment would be cleaned of mud and plant material prior to arriving at the Project location.

K. Identified Resource: Biological Soil Crusts and Soils

1. Issue Questions

- Would using tracked vehicles damage biological soil crusts if they are present?
- Would utilizing soils from vertical streambanks and re-contouring sites result in additional soil loss in the future?

2. Affected Environment

The soils in the Project Area are comprised solely of the Merlin-Observation-Lambring soil association. This association consists of shallow to very deep soils with textures varying from very cobbly loam to extremely stony clay loams and is typically found on lava plateaus and hills, mountains and mountain back slopes with slopes of 0 to 70 percent and are the result of volcanic colluvium and residuum. This association is well drained with very slow to moderate permeability which can lead to slight to moderate erosion due to water and slight erosion due to wind. The native vegetation associated with this soil series consists of: low sagebrush, big sagebrush, antelope bitterbrush, buckwheat, bluebunch

wheatgrass, Idaho fescue, and Sandberg bluegrass. In areas where rock outcrop and extremely stony surfaces are present, curl leaf mountain mahogany is the dominant plant.

Identification of biological soil crusts (BSC) at the species level is often not practical for fieldwork. The use of some basic morphological groups simplifies the situation. Morphological groups are also useful because they are representative of the ecological function of the organisms (Belnap et al., 2001). Using a classification scheme proposed in 1994 we can divide microbiota such as biological soil crusts into three groups based on their physical location in relation to the soil: hypermorphic (above ground), perimorphic (at ground) and cryptomorphic (below ground).

The morphological groups are:

1. Cyanobacteria - Perimorphic/cryptomorphic.
2. Algae - Perimorphic/cryptomorphic.
3. Micro-fungi - Cryptomorphic/perimorphic.
4. Short moss (under 10mm) - Hypermorphic.
5. Tall moss (over 10mm) - Hypermorphic.
6. Liverwort - Hypermorphic
7. Crustose lichen - Perimorphic.
8. Gelatinous lichen - Perimorphic.
9. Squamulose lichen - Perimorphic.
10. Foliose lichen - Perimorphic.
11. Fruticose lichen - Perimorphic.

Morphological groups 4, 5, 7, 8, and 9 are the dominant groups represented in the Project Area. Depending on precipitation amounts and microsites, groups 6, 10, and 11 may also be well-represented where the site-specific conditions required for their growth exist. Morphological groups 1, 2, and 3 are difficult to discern in the field as they require specialized tools which are not easily useable in the field. Soil surface microtopography and aggregate stability are important contributions from BSCs as they increase the residence time of moisture and reduce erosional processes. The influence of BSCs on infiltration rates and hydraulic conductivity varies greatly; generally speaking, infiltration rates increase in pinnacled crusts and decrease in flat crust microtopography. The northern Great Basin has a rolling BSC microtopography and the infiltration rates are probably intermediate compared to flat or pinnacled crustal systems. Factors influencing distribution of BSCs (Belnap et al., 2001) include, but are not limited to: elevation, soils and topography, percent rock cover, timing of precipitation, and disturbance.

Possible disturbances occurring in the Alder Creek allotment include, but are not limited to: effects from livestock grazing, juniper treatments, prescribed fire, vehicles, recreation, and human footprints. The specific contribution of these

activities to current BSC condition and cover is not discernable from other historic disturbances.

3. Environmental Consequences

The CEAA for Soils and BSCs is the Project Area and the areas directly adjacent to these areas, within 50 feet. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to the cumulative effects to Soils and BSCs include, but are not limited to, livestock grazing, juniper treatments, and recreational activities.

a. Alternative I - No Action Alternative

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Under the No Action Alternative, there would be no repairing of the headcut along Alder Creek. Soil would continue to be eroded and washed away along the streambanks. Within the riparian area, the main BSCs are tall and short mosses. These may be removed as channel incision migrates upstream and the riparian/wetland areas convert to upland vegetation.

EQUIPMENT ACCESS: Impediments to heavy equipment access would not be removed, nor would materials be removed from the site. Therefore, there would be no additional effect on soils or BSCs. Roads would continue to be used in their current manner leaving soils within the roadbed compacted and BSCs absent from the roadbed as a result.

CONSTRUCTION: Rock and fine grained soils would not be collected which would alleviate the need for off road travel within the Project Area and there would be no effect to soils and BSCs.

GRAZING EXCLUSION OF WET MEADOW: Under the No Action alternative, livestock would not be excluded from approximately 100 acres within the Alder Creek Allotment. Under current livestock management, this pasture is used every other year during May and June. Biological soil crusts in moderate to high use areas are vulnerable to disturbance when soils are wet. These BSCs, mainly tall and short mosses, are susceptible to breakage and removal from hoof sheer when soils are wet. Removing livestock trampling in saturated soils would eliminate this disturbance.

(2) JUNIPER TREATMENT

Juniper treatments would not occur under the No Action Alternative and therefore would have no impacts to soils or BSCs.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to BSCs. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: This alternative would stabilize the existing headcuts along Alder Creek, thus arresting their upstream migration. The BSCs upstream of the headcuts would be preserved. Installation of two cattleguards would have no measurable impacts to soils or BSCs.

EQUIPMENT ACCESS: Under the proposed action, obstructions in the current roadbed would be removed as well as large rocks and juniper directly adjacent to the road, in order to allow equipment access to the project area. All work is designed to take place within the current roadbed; however, if any of the project work occurs outside the roadbed due to accessibility reasons, soil will be impacted as a result of tire compaction or churning by tracked vehicles. These impacts would be noticeable until vegetation re-establishes, one to five growing seasons depending on annual precipitation. Biological soils crusts are currently nonexistent within the roadbed and would not be impacted by removal of obstructions unless, due to accessibility reason, work and/or travel occurred outside the roadbed. If work occurred outside the current roadbed the loss of BSCs could occur, specifically soil lichen which can take as many as 50 years or longer to re-establish.

CONSTRUCTION: The headcut restoration encompasses an area of approximately 150 acres. Within the 150 acres, there would be approximately 340 cubic yards of fine-grained soils removed from (at this time) non-specified vertical streambank sites for placement within the roughened channel section. These vertical streambanks are the results of erosional forces from Alder Creek and contribute to continued soil loss within the Project Area. The removal sites would be re-contoured and re-vegetated in order to prevent continued soil loss due to erosional forces from Alder Creek. Sites where rock would be collected would also be re-contoured and re-vegetated to prevent future soil loss. Heavy equipment would be utilized to access and remove the fine-grained soils and heavy rock. The impact to soils and BSCs at the site would be less due to tracked machines distributing the weight of the machine and load over steel or

rubber tracks resulting in lower ground pressures than other equipment (Blinn et al., 1998). Impacts would be further minimized by performing work when soils are not saturated, and preferably when frozen.

Where juniper with root wads are removed, holes would be backfilled or contoured and re-vegetated to prevent soil loss. Biological soil crusts are generally not found under the canopy of the juniper and therefore would not be affected by this action.

GRAZING EXCLUSION OF WET MEADOW: Excluding livestock from the wet meadow would prevent disturbance to wetland soils and BSCs. By removing livestock, vegetation would be allowed to re-establish and hold soil where in-stream work occurs and on converted terraces. Biological soil crusts, specifically short and tall mosses, would not be broken up and trampled by hoof sheer.

(2) JUNIPER TREATMENT

Where juniper would be cut, piled, and burned, reseeding would occur to prevent future soil loss by re-vegetating the site to hold the soil in place. Piling juniper where they are cut would prevent loss of biological soil crusts as they do not generally occur under the canopy of juniper. Burning when the ground is frozen would further protect soils.

(3) WEED TREATMENT

Weed treatments would not have measurable impacts to soils. Currently, there is no reliable research which has determined what impacts, if any, there would be to BSCs. One study regarding the application of glyphosate herbicides (Roundup® and Accord®) on moss-dominated BSCs had no short-term negative impacts on bryophyte cover, however this was a one-time application and most weed treatments require more than one

application (Belnap et. al. 2001). Treatments using Chlorsulfuron, Clopyrialid, and Imazapic have not been tested on BSCs.

L. Identified Resource: Recreation

1. Issue Question

- Would the alternatives have an effect on the recreation in the Project Area?

2. Affected Environment

The BLM lands in the area are open to motorized vehicle use. There are approximately 14.6 miles of roads within the Project Area. These roads are used

by private landowners to access private lands, used by permittees to access livestock developments, and used by the general public for recreation.

Camping mostly occurs within dispersed camps located throughout the Project Area. Recreation activities include, but are not limited to, fishing, hunting, camping, and off-highway vehicle (OHV) use. Hiking, horseback riding, and mountain biking also occur in the area, but use is light and dispersed. There are no designated recreation sites or trails. Camping and OHV use is highest during the fall mule deer, elk, and upland bird hunting seasons.

Travel within the Project Area is generally very limited from Mid-November to April due to wet road conditions and winter weather. Generally, public recreation use is very light and is limited to July–October.

3. Environmental Consequences

The CEAA for recreation is the Alder Creek Pasture. Past and present actions, such as those described in the affected environment above, have influenced the existing environment within the CEAA. The RFFAs in the CEAA contributing to cumulative effects to recreation include continued livestock grazing, additional juniper treatments (including cutting and burning), weed treatments, and road maintenance; these are also relevant to cumulative effects and are discussed under each resource as applicable.

a. Alternative I - No Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: As described in the Riparian, Wetland, and Water Quality Section, this alternative would result in the loss of meadow and riparian habitat. With this loss, recreation opportunities in the forms of fishing, hunting, and wildlife viewing would become marginal.

EQUIPMENT ACCESS: Under this alternative there would be no spot removal of boulders or juniper from the access route. This would have no effect on recreation. All-Terrain Vehicles (ATV) currently regularly access the wet meadow, particularly during the fall hunting season. Juniper or boulders along the route do not restrict ATV access.

CONSTRUCTION: There would be no construction related effects to recreation under this Alternative.

GRAZING EXCLUSION OF WET MEADOW: There would be no effect to recreationists from not building an exclosure.

(2) JUNIPER TREATMENT

Effects to recreation opportunities under the No-Action Alternative would be minimal, apart from a wildfire incident. Suppression activities could restrict recreational use, especially if a fire occurs during fall hunting seasons. For several years following wildfire, recreational use would be less desirable for camping and hunting due to loss of vegetation; changes in wildlife habitat, shade, and screening; and the blackened landscape. Should a large-scale wildfire not occur in the near future, juniper expansion would continue and negatively impact recreational activities including camping, hunting, and off-highway vehicle use. Camp sites and game animals would be more difficult to find, thereby decreasing successful hunting opportunities.

There would be no affect to recreation, because there are no changes.

(3) WEED TREATMENT

With the No Action Alternative, there would be no additional effects to recreation. Weed treatments would continue if and when weeds are found using the herbicides analyzed in the 1998 Burns District Noxious Weed Program Management EA (DR OR-020-98-05).

b. Alternative II - Proposed Action

(1) HEADCUT RESTORATION

MEADOW AND SMALL HEADCUT RESTORATION: Over the long-term, recreational activities related to big game hunting and wildlife viewing should be enhanced as habitat function and landscape diversity would be expected to improve over time.

EQUIPMENT ACCESS: Spot removal of juniper and boulders to allow equipment access are not expected to increase visitor use of the route as these activities would not upgrade route conditions.

CONSTRUCTION: There would be short-term impacts to visitors during fall hunting seasons when most visitations occur. Smoke, dust, noise, and vehicle traffic related to construction would temporarily discourage users from entering or remaining in the vicinity. Over the long-term, visitor use would not be expected to be negatively affected and recreational activities related to big game hunting and wildlife viewing should be enhanced as habitat function and landscape diversity are expected to improve over time.

GRAZING EXCLUSION OF WET MEADOW: Over the long-term, visitor use would not be expected to be negatively affected and recreational activities related to big game hunting and wildlife viewing should be enhanced as riparian function improves as a result of stable in-stream structures. The exclosure would contain gates, which recreationists would have to open and close as they enter or leave the site, creating a minor inconvenience.

(2) JUNIPER TREATMENT

There would be short-term impacts to a number of visitors during treatment periods, particularly if they take place during fall hunting seasons when most visitations occur. Smoke, dust, noise, and vehicle traffic related to juniper treatments would temporarily discourage users from entering or remaining in the vicinity. Over the long-term, visitor use would not be expected to be negatively affected and recreational activities related to big game hunting and wildlife viewing should be enhanced as habitat function and landscape diversity are expected to improve over time.

(3) WEED TREATMENT

The application of specific herbicides within the Project Area would have no measureable direct impacts to recreational opportunities.

CHAPTER IV: CONSULTATION AND COORDINATION

A. Tribes, Individuals, Organizations, or Agencies Consulted

The BLM met with Oregon Department of Fish and Wildlife (ODFW) on November 30, 2011, Oregon Water Resources on November 1, 2012, and had an on-site meeting with the Nature Conservancy on October 9, 2012, to discuss the proposed project. Burns Paiute Tribe, Oregon Natural Desert Association (ONDA), and Oregon Wild were consulted through direct mailing. Discussion with ONDA also occurred over the phone on February 2, 2012. Site visits with Grant County Soil and Water Conservation District occurred three times during the summers of 2011 and 2012. The ODFW Fish Passage Team have reviewed the preliminary designs and their comments were incorporated into the proposed headcut design.

B. Summary of Public Participation

The BLM mailed eight scoping letters on January 20, 2012, and December 31, 2012, to the following: Harney County Courthouse; ONDA-Portland; ONDA-Bend; Allotment Permittee, Second Oregon LLC (permittee); Burns Paiute Tribe; Harney Soil and Water Conservation District; and ODFW. Phone conversation with ONDA about the project also occurred on February 2, 2012.

C. List of Preparers

- Tomas Kamienski, Wildlife Biologist, B.S. Wildlife Science, M.S. Range Science, Minor in GIS, 6 years professional experience.
- Nicholas Miller, Wildlife Biologist, B.S. Fisheries and Wildlife Sciences, 13 years professional experience.
- Holly Orr, Planning and Environmental Coordinator, B.S. Business Administration, 2 years professional experience.
- Lindsay Davies, Fish Biologist, B.S. Marine Science, Minor Environmental Science, 11 years professional experience.
- Caryn Burri, Natural Resource Specialist (NRS) - Botany, B.S. Natural Resource Management, 5 years professional experience.
- Lesley Richman, Weed Specialist, M.S. Rangeland Management, 25 years professional experience.
- Scott Thomas, District Archaeologist, B.S. Zoology, M.A. Anthropology, 27 years professional experience.
- Rick Wells, Geologist, B.S. Geology, 25 years of professional experience.
- Tom Wilcox, Wilderness Specialist, Arthur Carhartt Wilderness Center Certified, 1 year professional experience.
- Chad Rott, District Fuels Specialist, Biological Sciences for Federal Land Managers 0401 Program, 20 years professional experience.
- Eric Haakenson, Outdoor Recreation Planner, B.S. Natural Resource Sciences, 22 years professional experience.
- Tim Newkirk, Forester/Project lead, B.S. in Forest Ecosystem Management, 10 years professional experience.

- Connie Pettyjohn, Agricultural Business Management, Management and Program Analyst, Transportation/Roads, 7 years professional experience.
- Breanna O'Connor, NRS, B.S. Natural Resources, M.S. Forest Resources, 1 year of professional experience.
- Lisa Grant, Riparian Specialist, B.S. Range, 10 years professional experience.
- Travis Hatley, Range Management Specialist, B.S. Range, 1 year professional experience.
- Travis Miller, Range Management Specialist, B.S. Range, M.S Animal and Range Science, 8 years professional experience.

Chapter V: References

Adams, A.W. 1975. A brief history of juniper shrub populations in southern Oregon. Oregon State Wildlife Commission. Wildlife Res. Rep No. 6. Agee, J.K. 1993. Fire ecology of Pacific Northwest forests.

Adams, M.J., C.A. Pearl, S. Galvan, B. McCreary, N. Chelgren, and D. Pilliod. 2011. Amphibian research and monitoring initiative. Pacific Northwest Region 2011 Annual Report. U.S.

Asay, K. H., W. H. Horton, K. B. Jensen, and A. J. Palazzo. 2001. Merits of native and introduced Triticeae grasses on semiarid rangelands. Canadian Journal of Plant Science 81:45–52.

Bangs, B., S. Gunckel, and S. Jacobs. 2008. *Distribution and Abundance of Redband Trout Oncorhynchus mykiss in the Malheur River Basin, 2007*. Oregon Department of Fish and Wildlife, Final Report. Corvallis.

Bender, L. C., L. A. Lomas, and T. D. Kamienski. 2007. Habitat effects on condition of doe mule deer in arid mixed woodland–grassland. Rangeland Ecology and Management 60:277–284.

Berg, L. and T.G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Onchorhynchus kisutch*) following short-term pulses of suspended sediment. Can. J. Fish. Aquat. Sci. 42: 1410-1417.

Belnap, Jayne, David Eldridge, Julie Hilty Kaltenecker, Steve Leonard, Roger Rosentreter and John Williams. (2001).Biological Soil Crusts: Ecology and Management (TR-1730-02). Denver, Co: USDI-BLM Printed Materials Distribution Center.

Blinn, C.R., R. Dahlman, L. Hislop, and M.A. Thompson. 1998. Temporary Stream and Wetland Crossing Options for Forest Management. GTR NC – 202. U.S. Dept. of Agriculture, Forest Service, North Central Research Station, St. Paul, Minnesota. P. 31.

Bureau of Land Management (USDI BLM). 1991. *Proposed Three Rivers Resource Management Plan and Final Environmental Impact Statement*. Burns District Office, Hines, Oregon. September 1991.

Bureau of Land Management (USDI BLM). 1992. *Three Rivers Resource Management Plan, Record of Decision and Rangeland Program Summary.* Burns District Office, Hines, Oregon. August 1992.

Bureau of Land Management (USDI BLM). 2007. Final Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in the 17 Western States. BLM. Washington D.C.

Bureau of Land Management (USDI BLM). 2007. Record of Decision Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in the 17 Western States. BLM. Washington D.C. Accessed at website: http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/veis/dear_reader_letter.Par.95872.File.dat/RecordofDecision.pdf.

Bureau of Land Management, 2010a. *California Desert Conservation Area Plan Amendment/Final Environmental Impact Statement for Ivanpah Solar Electric Generating System, FEIS-10-31*. Appendix B. July 2010. Referenced in text as (Appendix C).

Bureau of Land Management (USDI BLM). 2010. Final Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon. BLM. Portland, OR. July 2010.

Bureau of Land Management (USDI BLM). 2010. Vegetation Treatments Using Herbicides on BLM Lands in Oregon Record of Decision. BLM. Oregon State Office. October 2010.

Bureau of Land Management (USDI BLM). National Environmental Policy Act Handbook H-1790-1. Accessed on January 23, 2015, at http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.24487.File.dat/h1790-1-2008-1.pdf.

Bunting, S.C., J.L. Kingery, and E. Stand. 1999. Effects of succession on species richness of the western juniper woodland/sagebrush steppe mosaic. Pages 76-81. In S.B. Monsen, S. Richards, R.J. Tausch, R.F. Miller, and C. Goodrich (compilers) Proceedings Ecology and Management of pinon-juniper communities within the Interior West. USDA Forest Service, RMRS-P-9.

Burkhardt, J.W., and E.W. Tisdale. 1969. Nature and successional status of western juniper vegetation in Idaho. Journal of Range Management 22: 64-270.

Burkhardt, J.W., and E.W. Tisdale. 1976. Causes of Juniper Invasion in Southwestern Idaho. Ecology 57(3): 472-484.

CONSUME 3.0. Fire and Environmental Research Applications Team, Pacific Wildland Fire Sciences Laboratory. Accessed January 28, 2015 at: http://www.fs.fed.us/pnw/fera/research/smoke/consume/index.shtml.

Davies, K.W., R.L. Sheley. 2011. Promoting Native Vegetation and Diversity in Exotic Annual Grass Infestations. Restoration Ecology Vol. 19, No. 2, pp. 159-165.

Davies, K.W. 2010. Revegetation of Medusahead-Invaded Sagebrush Steppe. Rangeland Ecol Manage 63:564–571.

Denman, K. L. 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (eds. Solomon, S. et al.) 499–587 (Cambridge Univ. Press, Cambridge, 2007).

Estimating the Biomass of Piled Fuels for Smoke Management Planning. Fire and Environmental Research Applications Team, Pacific Wildland Fire Sciences Laboratory. Accessed January 28,2015 at: http://www.fs.fed.us/pnw/fera/research/smoke/piles/index.shtmlFire.

FISRWG (10/1998). Stream Corridor Restoration: Principles, Processes, and Practices. By the Federal Interagency Stream Restoration Working Group (FISRWG)(15 Federal agencies of the US gov't). GPO Item No. 0120-A; SuDocs No. A 57.6/2:EN 3/PT.653. ISBN-0-934213-59-3.

Forster P.M. 2007. Climate Change 2007: The Physical Science Basis. Changes in atmospheric constituents and in radiative forcing. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge: Cambridge University Press) pp 129–234.

Gamperl, K. and K. Rodnick. 2003. Metabolic and Thermal Physiology of Eastern Oregon Redband Trout: Recommendation for Appropriate Numeric Temperature Criteria. Final Report. ODEQ.

Geological Survey, Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon. December 22, 2011. p. 25.

Hunter, Christopher J. *Better Trout Habitat: A Guide to Stream Restoration and Management.* Montana Land Reliance and Island Press, Washington, DC (1991): 321.

Knapp and Soule'. 1998. Recent Juniperous occidentalis (western juniper) expansion on a protected site in central Oregon. Global Change Biology 4:347-357.

James, Jeremy J., Tony J. Svejcar, and Matthew J. Rinella. 2011. Demographic processes limiting seedling recruitment in arid grassland restoration. *Journal of Applied Ecology 48, 961-969.*

Jewett, David G., Mark L. Lord, Jerry R. Miller, and Jeanne C. Champers. "Geomorphic and Hydrologic Controls on Surface and Subsurface Flow Regimes in Riparian Meadow Ecosystems." *Great Basin Riparian Areas: Ecology, Management, and Restoration*. Washington, DC: Island, 2004.

Kondratieff, M.C., C.A. Myrick. 2006. How High Can Brook Trout Jump? A Laboratory Evaluation of Brook Trout Jumping Performance. Transactions of the American Fisheries Society. 135:2.

Kufeld, R.C., O.C. Wallmo, and C. Feddema. 1973. Foods of the Rocky Mountain mule deer. USDA Forest Service Res. Pap. RM-111.

Manci, Karen M. 1989. Riparian ecosystem creation and restoration: A literature summary. U.S. Fish and Wildlife Service Biological Report 89(20):1-59. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/habitat/ripareco/index.htm (Version 16JUL97).

Meinzer, Oscar E. (1923). Outline of ground-water hydrology, with definitions. Washington, DC: US Geological Survey (USGS). p. 57.Water Supply Paper 494.

Meyer, K.A., Lamansky, J.A., Schill, D.J. 2010. Biotic and abiotic factors related to redband trout occurance and abundance in desert and montane streams. Western North American Naturalist 70 (1) 77-91.

Miller, R.F. and Rose, J.A. 1995. Historic expansion of *Juniperus occidentalis* (western juniper) in southeastern Oregon. Great Basin Naturalist 55:37-45.

Miller, R.F. and Rose, J.A. 1999. Fire history and western juniper encroachment in sagebrush steppe. Journal of Range Management. November 1999. 52

Miller, R.F., T. Svejcar, and J.A. Rose. 2000. Impacts of western juniper on plant community composition and structure. Journal of Range Management. 53:574-585

Miller, R.F., Baisan, C., Rose, J.A. and Pacioretty, D. 2001. Pre- and post-settlement fire regimes in mountain big sagebrush steppe and quaking aspen in the northwest Great Basin. National Interagency Fire Center Final Report, Eastern Oregon Agricultural Research Center, Oregon State University, Burns, OR.

Miller, R.F., Bates, J.D., Svejcar, T.J., Pierson, F.B., and Eddleman, L.E. 2005. Biology, Ecology, and Management of Western Juniper. Technical Bulletin 152. Oregon State University, Agricultural Experiment Station. Corvallis, OR.

Minnesota Department of Natural Resources. Resource Sheet 1: Streambank Erosion and Restoration. 2010. Available Online. Accessed 10/28/2014.

Monaco, T.A., B.L. Waldron, R.L. Newhall and W.H. Horton. 2003. Re-establishing Perennial Vegetation in Cheatgrass Monocultures. *Rangelands 25(2):26-29.*

Muller-Schwarze, D. and L. Sun. 2003. The Beaver: Natural History of a Wetlands Engineer. Ithaca, New York : Cornell University Press.

Munger, J.C., M. Gerber, M. Carroll, K. Madric, and C. Peterson. 1996. Status and habitat associations of the spotted frog (Rana pretiosa) in southwestern Idaho. Bureau of Land Management Technical Bulletin No. 96–1. Boise, Idaho. p. 112.

Natural Resources Conservation Service, United States Department of Agriculture. Soil Series Classification Database. Available online. Accessed 03/21/2014.

Oregon Department of Fish and Wildlife. 2012. Guidelines for Relocation of Beaver in Oregon.

Oregon Department of Fish and Wildlife. 2013. Fish Passage Barrier Inventory. Available Online. Accessed 11/10/2014.

Pierson, F.B., J.D. Bates, and T.J. Svejcar. 2007. Long-term erosion changes in runoff and erosion after cutting western juniper. Rangeland Ecology and Management.

Pierson, F.B., W.H. Blackburn, S.S. Van Vactor, and J.C. Wood. 1994. Partitioning small scale spatial variability of runoff and erosion on sagebrush rangeland. Water Resources Bulletin 30:1081-1089.

Pollock, Michael M., M. Heim, and D. Werner. 2003. Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes. American Fisheries Society Symposium 37.

Reaser, J.K., and D.S. Pilliod. 2005. Rana luteiventris, Columbia spotted frog. Pages 559–562 in M. Lannoo (editor), Amphibian Declines: The Conservation Status of United States Species. University of California Press, Berkeley, California.

Reeves, G.H., and T.D. Roelofs. 1982. Influence of forest and rangeland management on anadromous fish habitat in western North America: rehabilitating and enhancing stream habitat: 2. Field applications. USDA For. Serv. Gen. Tech. Rep. PNW-140. 38 pp.

Rieman, B.E., and J.L. Clayton. 1997. Fire and fish: issues of forest health and conservation of native fishes. Fisheries 22(11):6-15.

Roberts, C., and J.A. Jones. 2000. Soil patchiness in juniper-sagebrush-grass communities of central Oregon. Plant and Soil 223:45-61.

Rosell, Frank, O. Bozser, P. Collen, and H. Parker. 2005. Ecological impact of beavers *Castor fiber* and *Castor Canadensis* and their ability to modify ecosystems. Mammal Rev. 35:248-276.

Rosgen, David L. *Applied River Morphology*. Pagosa Springs, CO: Wildland Hydrology, 1996. Print.

Shields Jr., F. D., R. E. Lizotte Jr., S. S. Knight, C. M. Cooper, and D. Wilcox. 2010. The stream channel incision syndrome and water quality. Ecological Engineering. 36, 78-90.

Soule', P., and P. Knapp. 1999. Western juniper expansion on adjacent disturbed and near-relict sites. Journal of Range Management 52:525-533.

United States Code. 42 U.S.C. § 7475 (d)(2)(B). Accessed at website: http://www.gpo.gov/fdsys/pkg/USCODE-2010-title42/pdf/USCODE-2010-title42-chap85-subchapI-partC-subparti-sec7475.pdf.

United States Environmental Protection Agency. 2012. Overview of Greenhouse Gas Emissions. http://www.epa.gov/climatechange/ghgemissions/gases/co2.html Retrieved 6/16/14.

United States Fish and Wildlife Service. 2008. *Birds of Conservation Concern for the Great Basin Region.*

United States Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form: Columbia Spotted Frog. California Nevada Region 8. 2012.

United States Geological Survey May 14, 2008 Memorandum to the U.S. Fish and Wildlife Service. The Challenges of Linking Carbon Emissions, Atmospheric Greenhouse Gas Concentrations, Global Warming, and Consequential Impacts. http://www.usgs.gov/climate_landuse/info_quality_docs/director_memo_14may08.pdf Retrieved 6/16/14.

Wall, T.G., R.F. Miller, T.J. Svejcar. 2001. Juniper encroachment into aspen in the northwest Great Basin. J. Range Manage. 54:691-698.

Waters, T.F. 1995. Sediment in streams: sources, biological effects and control. American Fisheries Society, Bethesda, Md. 251 p.

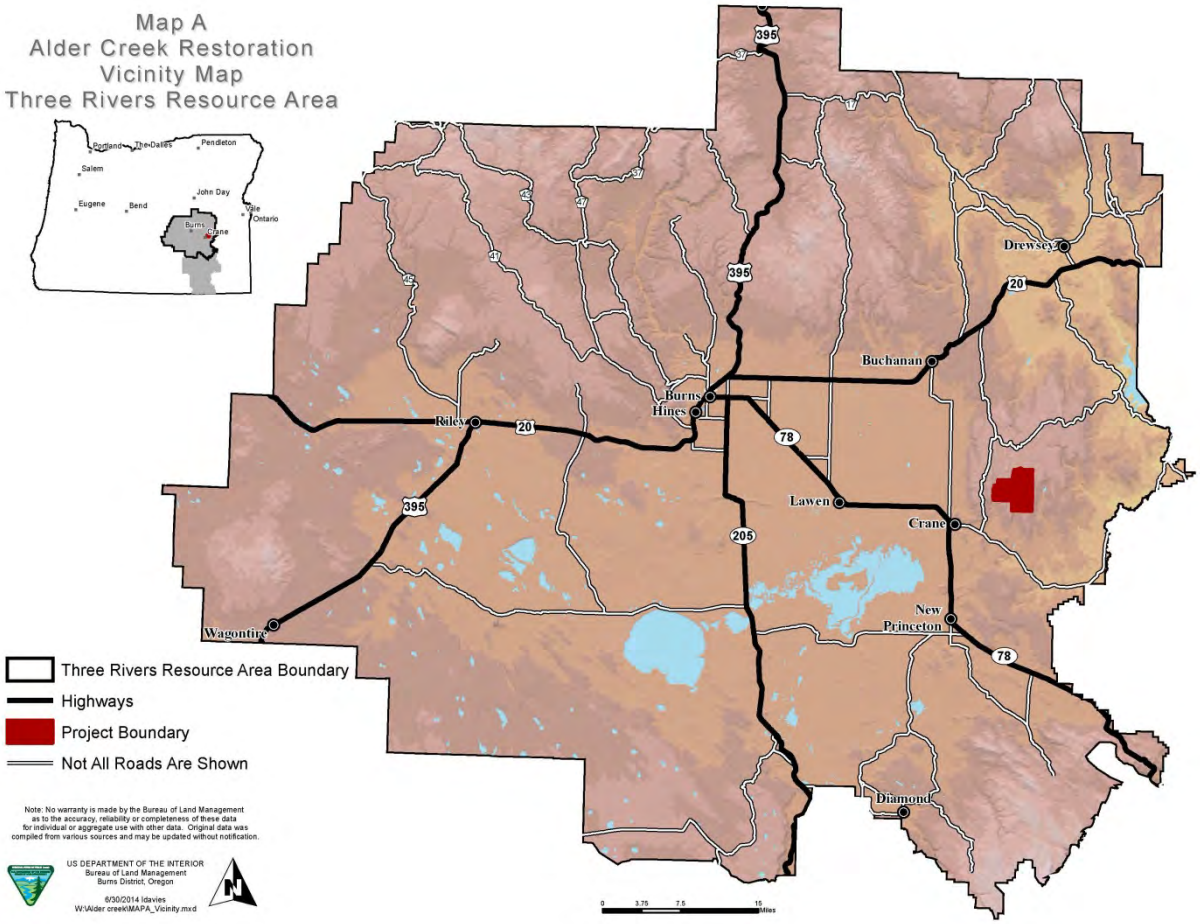
Welch, N.E., and J.A. MacMahon. 2005. Identifying habitat variables important to the rare Columbia spotted frog in Utah (U.S.A.): an information-theoretic approach. Conservation Biology 19:473–481.

Wilcox, J. et al., Feather River Resource Management Group. December 2001. Evaluation of geomorphic restoration techniques applied to fluvial systems. Available from: http://www.featherrivercrm.org/publications/preports/georest/cover.html.

Wilson, G. (2011). *Alder Creek Headcut Preliminary Design Report.* John Day, Oregon: Grant County Soil and Water Conservation District (SWCD).

APPENDIX A - Maps

Map A, Vicinity Map
Map B, Project Map
Map C, Proposed Access Route


Map A
Alder Creek Restoration
Vicinity Map
Three Rivers Resource Area
Portland
The Dalles
Pendleton
Salem
John Day
Eugene
Bend
Vale
Ontario
Burns
Crane
395
Drewsey
20
Buchanan
Burns
Hines
Riley
78
Lawen
Crane
205
New
Princeton
Wagontire
Diamond
Three Rivers Resource Area Boundary
Highways
Project Boundary
Not All Roads Are Shown
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.
US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Oregon
6/30/2014 ldavies
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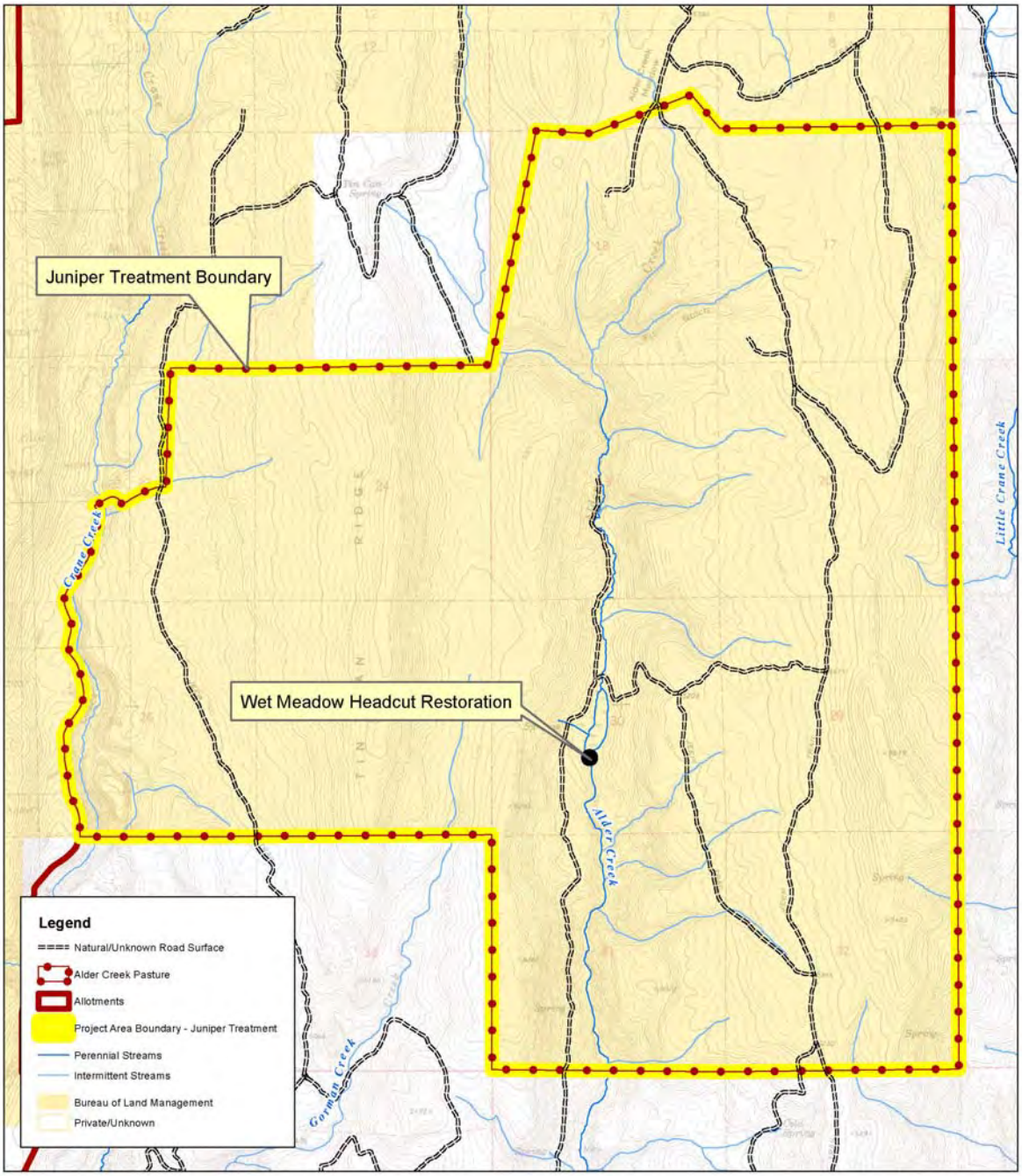
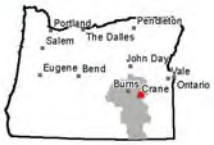
N
0 3.75 7.5 15 Miles





Map B: Project Map
Alder Creek Restoration

1 Miles

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Bureau of Land Management
Burns District, Oregon

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6/30/2014 ldavies
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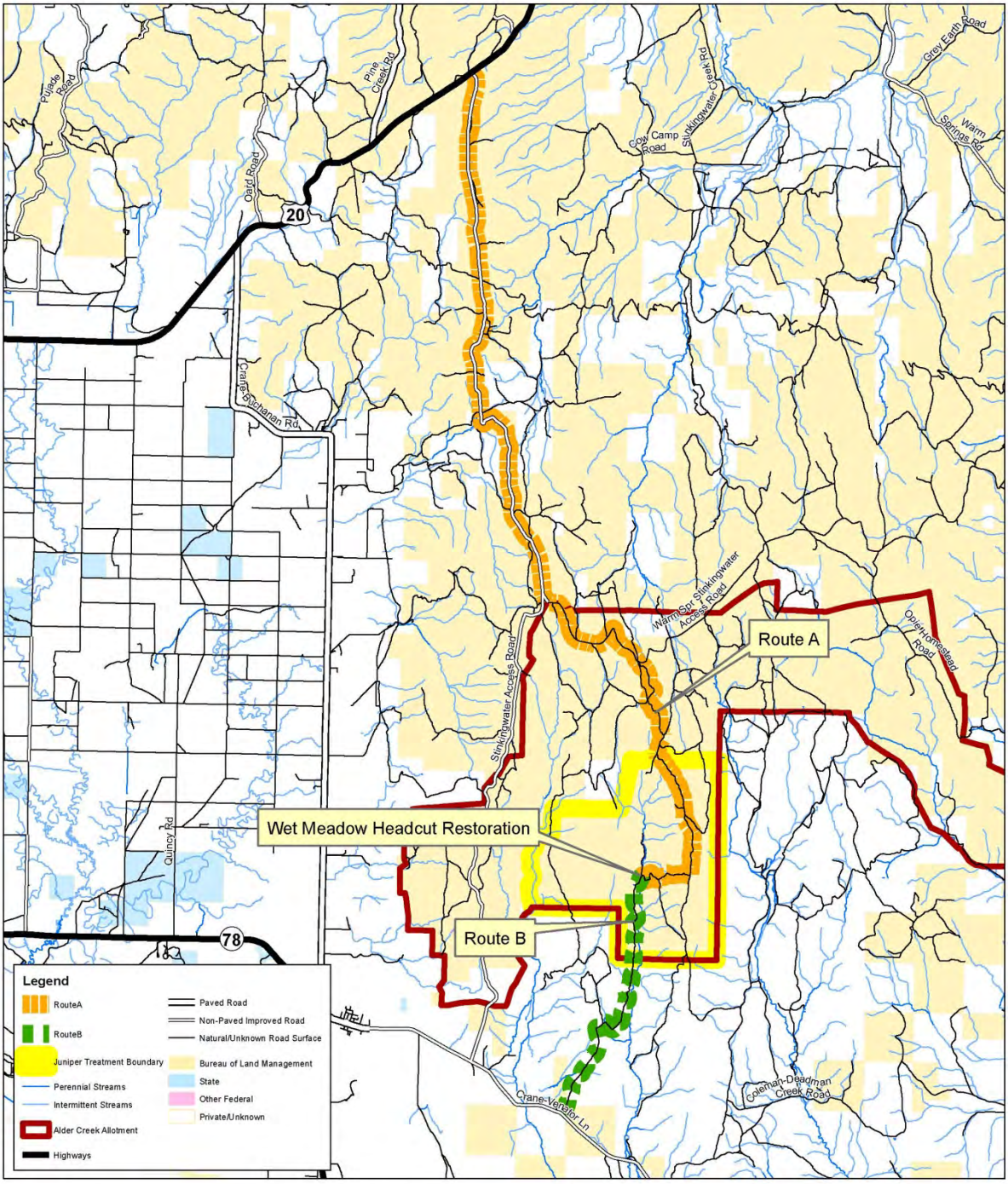
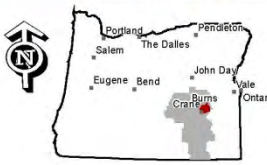


Map C: Access Routes
Alder Creek Restoration

5 Miles



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US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Oregon

8/4/2014 ldavies
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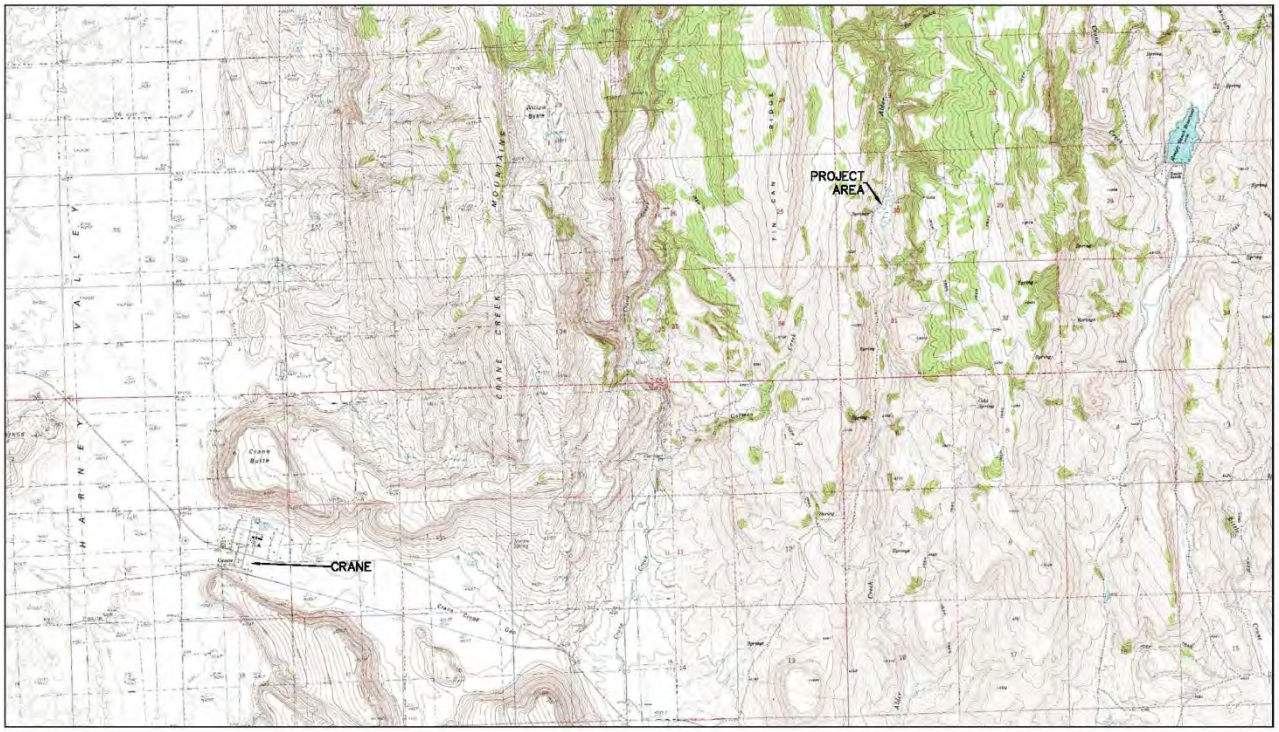
APPENDIX B - Construction Plans



C1 LOCATION MAP
C2 SITE PLAN
C3 PLAN & PROFILES
C4 ROUGHENED CHANNEL PLAN
C5 ROUGHENED CHANNEL PROFILE & CROSS-SECTION
C6 TYPE K LOG STRUCTURE PLAN & CROSS-SECTION
C7 TYPE W LOG STRUCTURE PLAN & CROSS-SECTION
C8 TYPE VX LOG STRUCTURE PLAN & CROSS-SECTION
C9 ROCK GRADE CONTROL STRUCTURE PLAN & CROSS-SECTION
C10 CONSTRUCTION AREA PLAN
C11 TEMPORARY CROSSING PLAN & CROSS-SECTION

N

GRAPHIC SCALE
250 0 250
(IN FEET)

1" = 450'

REGISTERED PROFESSIONAL ENGINEER
OREGON
DECEMBER 3, 1974
GARY A. WILSON

FOR DESIGN REVIEW ONLY

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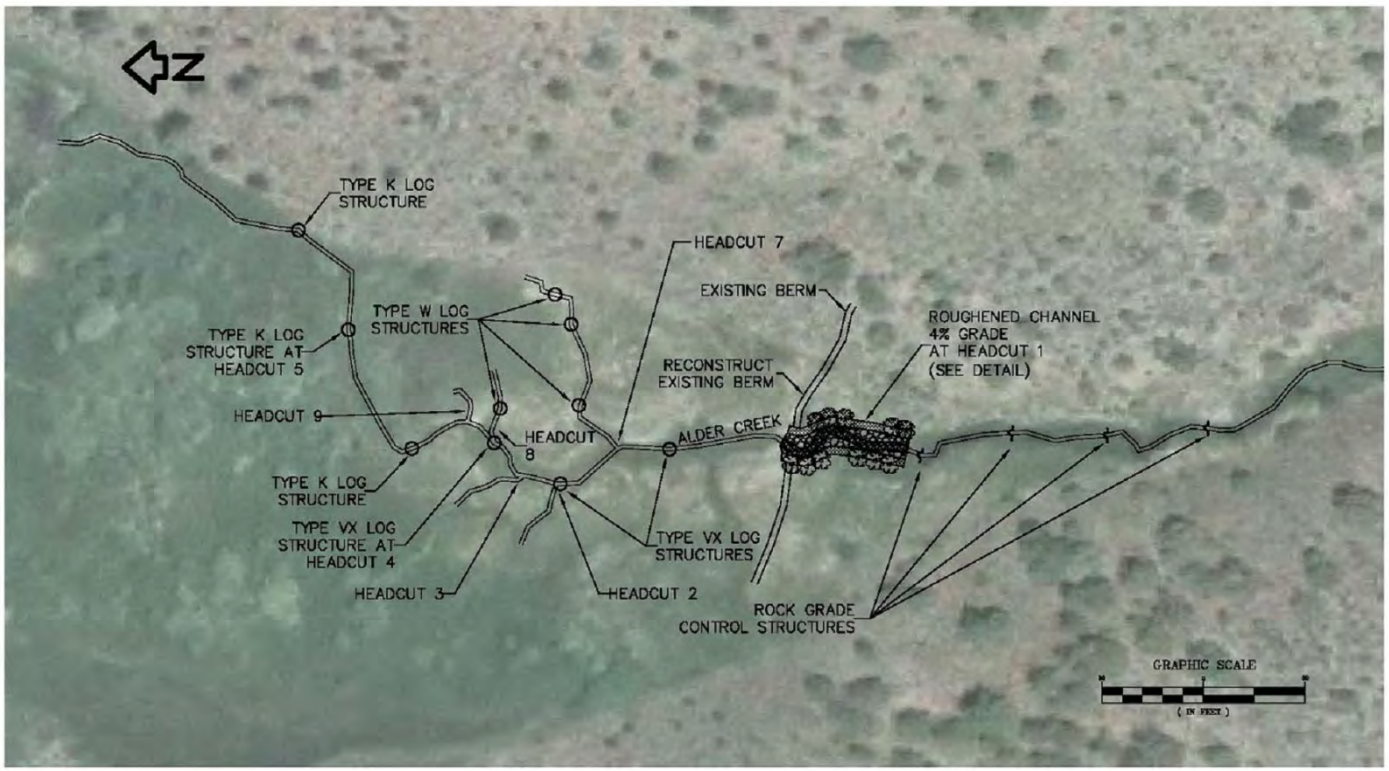
REVISIONS	BY

BLM – ALDER CREEK
HEADCUT RESTORATION
HARNEY COUNTY, OREGON

LOCATION MAP

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C1
OF 11 SHEETS



REGISTERED PROFESSIONAL ENGINEER
11450
OREGON
DECEMBER 3, 1997
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HEADCUT RESTORATION
HARNEY COUNTY, OREGON

SITE PLAN

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
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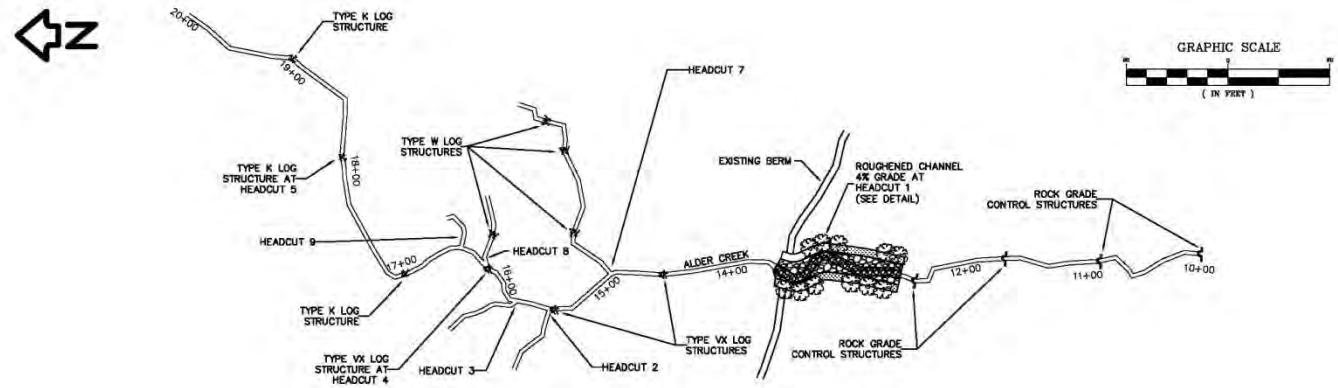
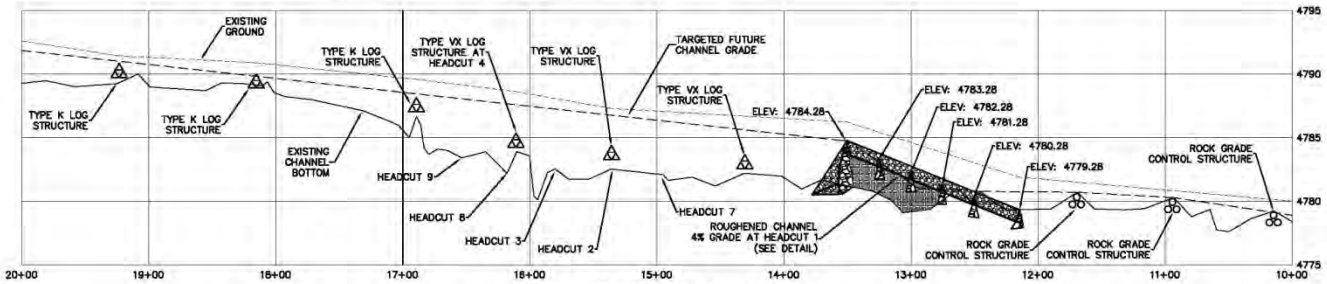
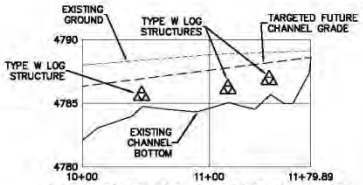
SHEET C2
OF 11 SHEETS





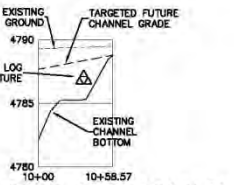
ALDER CREEK PROFILE

SCALE: HORIZ: 1=10'
VERT: 1=1'



HEADCUT 7 PROFILE

SCALE: HORIZ: 1=10'
VERT: 1=1'



HEADCUT 8 PROFILE

SCALE: HORIZ: 1=10'
VERT: 1=1'

REGISTERED PROFESSIONAL ENGINEER
OREGON
DECEMBER 3, 1974
GARY A. WILSON
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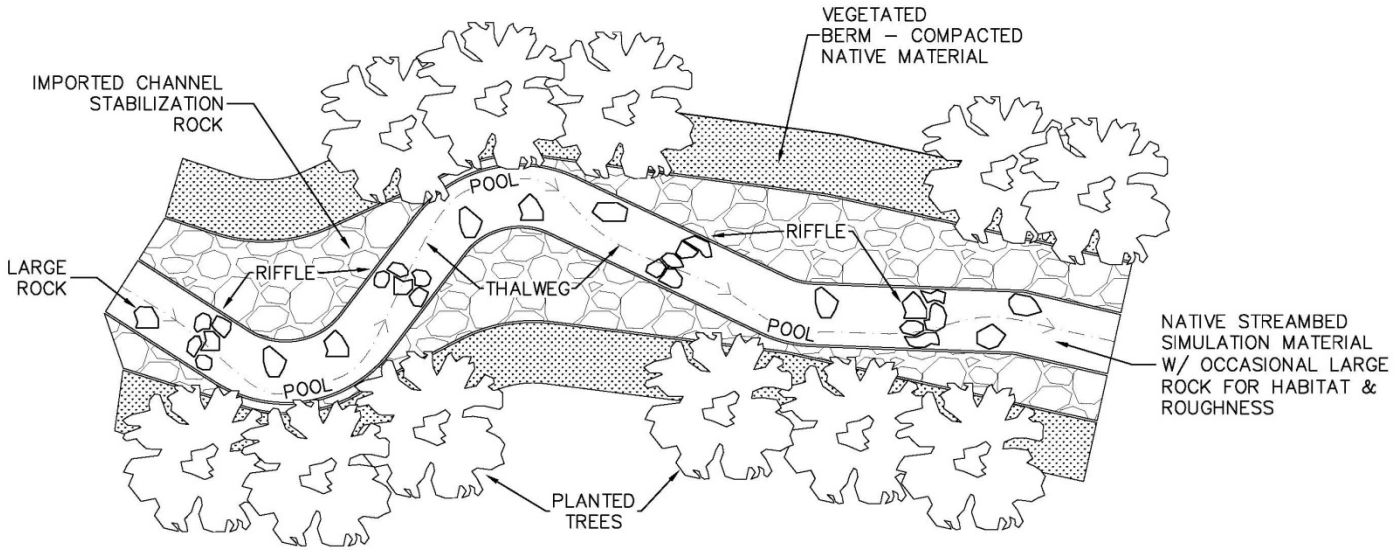
HEADCUT RESTORATION
HARNEY COUNTY, OREGON

PLAN & PROFILES

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C3
OF 11 SHEETS



ROUGHENED CHANNEL PLAN

REGISTERED PROFESSIONAL ENGINEER
11-150
OREGON
DECEMBER 3, 1974
GARY A. WILSON
EXPIRES 6/30/2014

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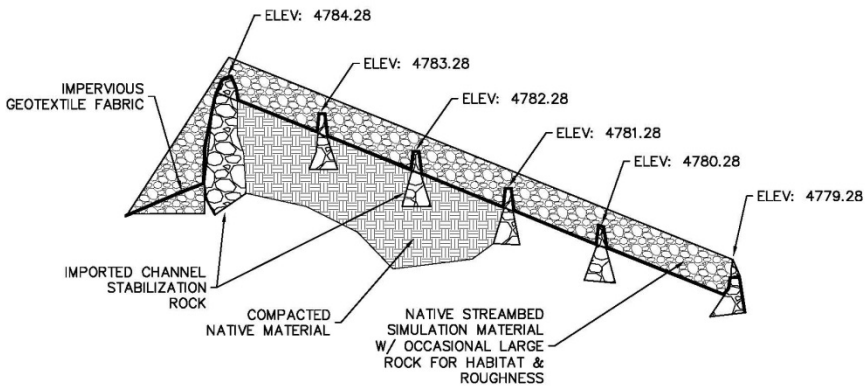
BLM – ALDER CREEK
HEADCUT RESTORATION
HARNEY COUNTY, OREGON

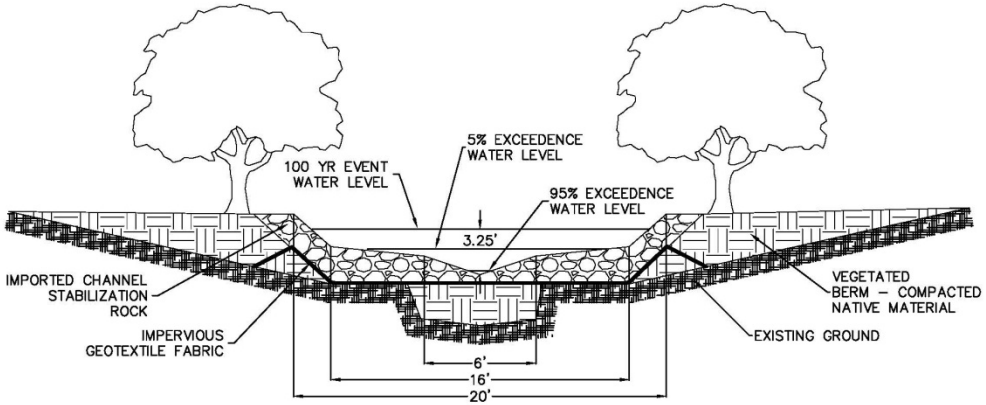
ROUGHENED CHANNEL PLAN

GRANT SOIL AND WATER
CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C4
OF 11 SHEETS



ROUGHENED CHANNEL PROFILE



ROUGHENED CHANNEL CROSS–SECTION

REGISTERED PROFESSIONAL ENGINEER
11-156
OREGON
DECEMBER 3, 1974
GARY A. WILSON
EXPIRES 6/30/2014

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REVISIONS	BY

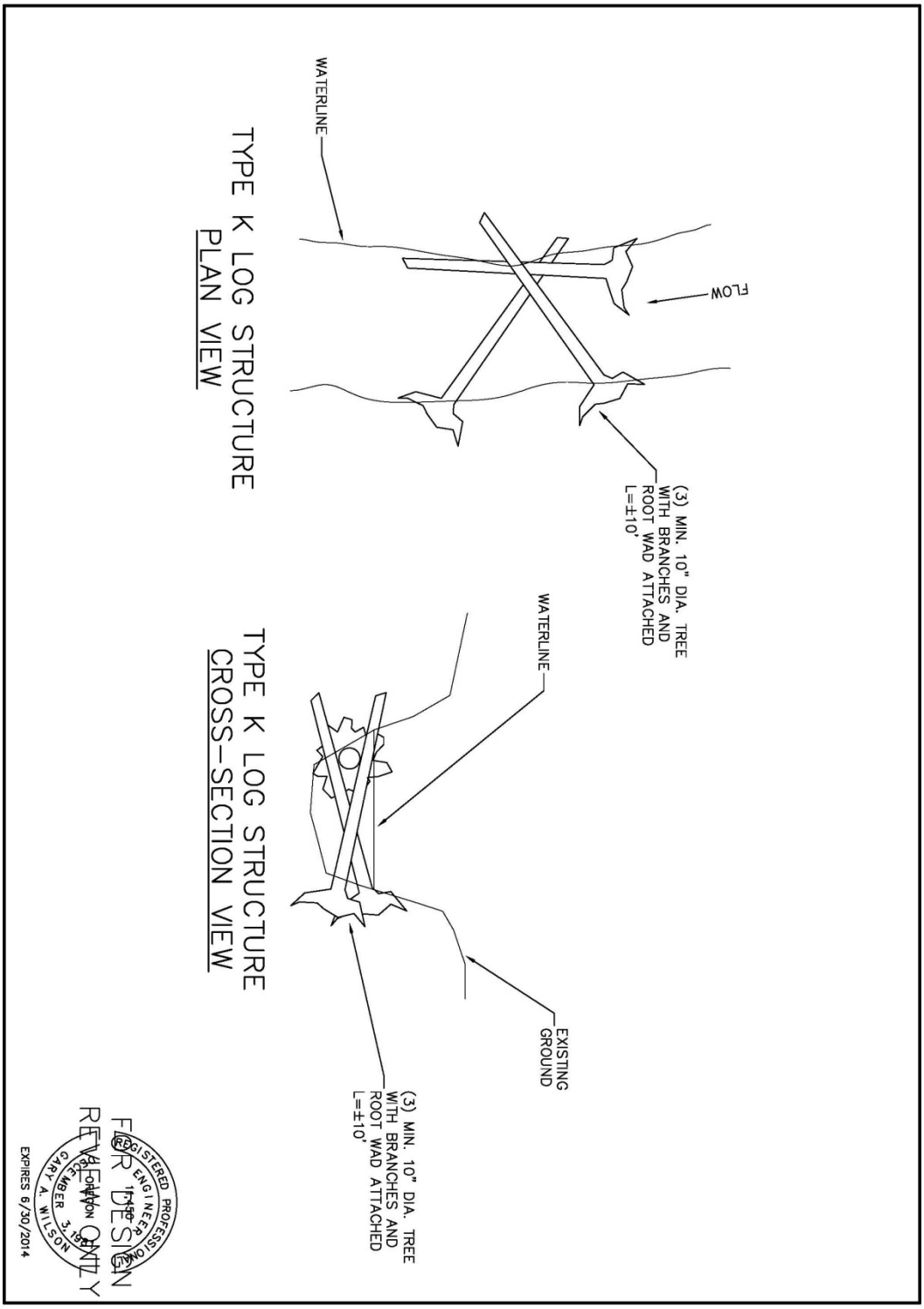
BLM – ALDER CREEK HEADCUT RESTORATION

HARNEY COUNTY, OREGON

ROUGHENED CHANNEL PROFILE & CROSS–SECTION

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575–0135
DRAWING: BLM–ALDER–CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C5
OF 11 SHEETS



GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

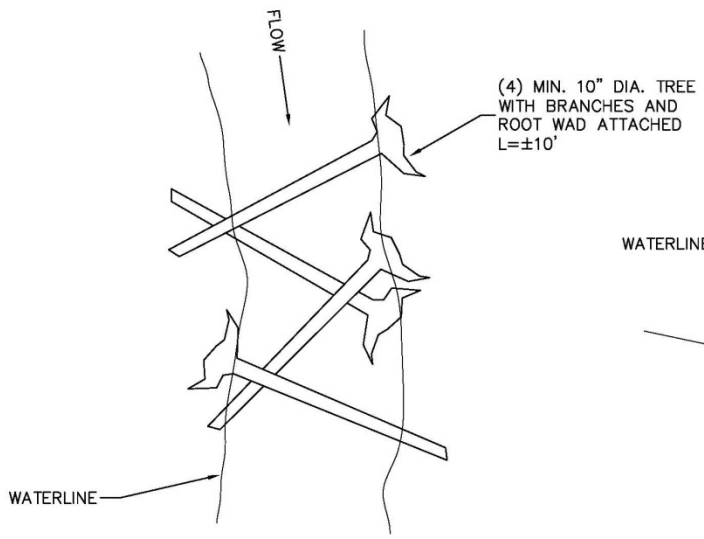
DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C6 OF 11 SHEETS

TYPE K LOG STRUCTURE PLAN & CROSS-SECTION

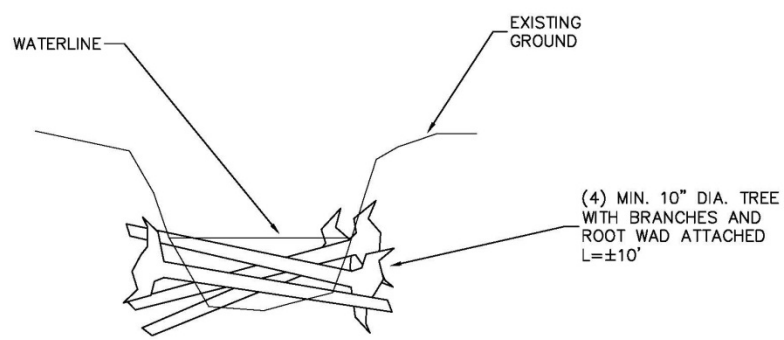
BLM – ALDER CREEK HEADCUT RESTORATION

HARNEY COUNTY, OREGON

REVISIONS | BY



TYPE W LOG STRUCTURE
PLAN VIEW



TYPE W LOG STRUCTURE
CROSS-SECTION VIEW

FOR DESIGN
REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER
11,450
OREGON
DECEMBER 3, 1996
GARY A. WILSON
EXPIRES 6/30/2014

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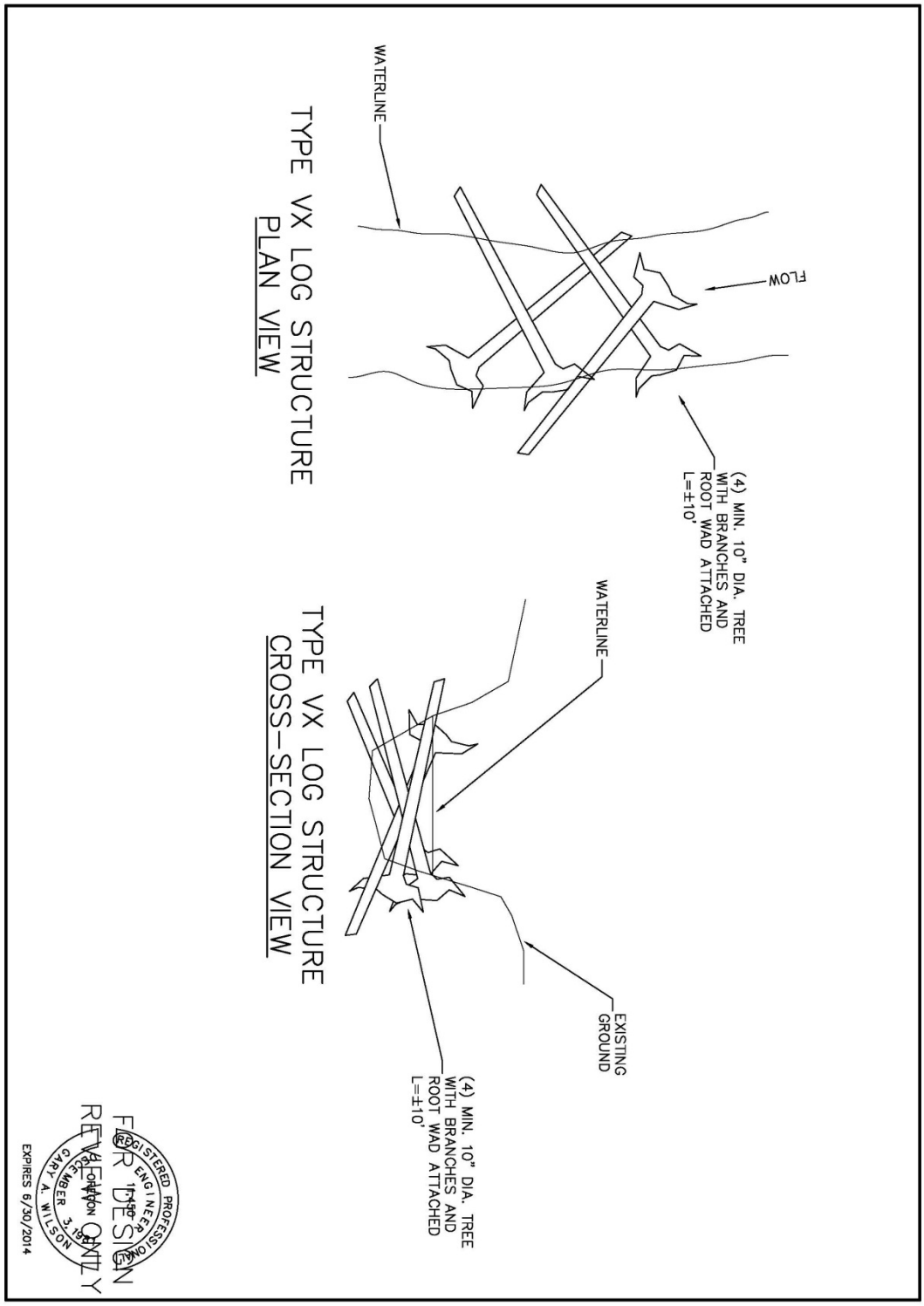
BLM – ALDER CREEK
HEADCUT RESTORATION
HARNEY COUNTY, OREGON

TYPE W LOG STRUCTURE PLAN & CROSS-SECTION

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C7
OF 11 SHEETS



GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135
DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C8 OF 11 SHEETS

TYPE VX LOG STRUCTURE PLAN & CROSS-SECTION

BLM – ALDER CREEK HEADCUT RESTORATION

HARNEY COUNTY, OREGON

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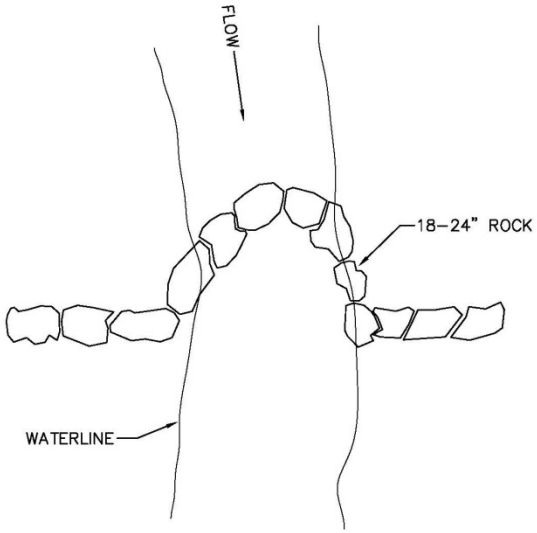
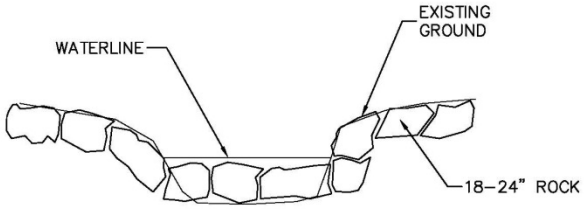


ROCK GRADE CONTROL STRUCTURE
PLAN VIEW



ROCK GRADE CONTROL STRUCTURE
CROSS–SECTION VIEW

FOR DESIGN REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER
11-150
OREGON
DECEMBER 3, 1974
GARY A. WILSON
EXPIRES 6/30/2014

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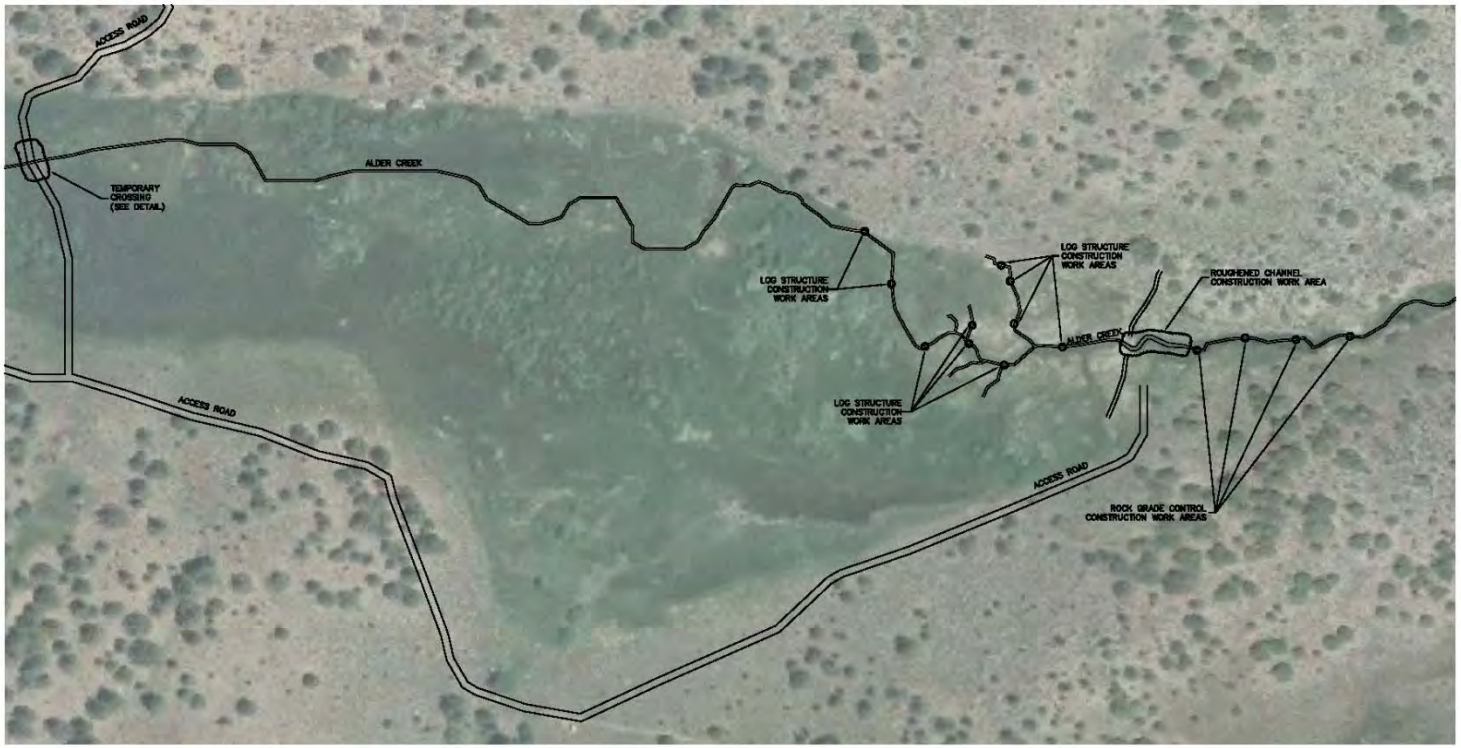
HEADCUT RESTORATION
HARNEY COUNTY, OREGON

ROCK GRADE CONTROL STRUCTURE PLAN & CROSS–SECTION

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575–0135
DRAWING: BLM–ALDER–CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C9
OF 11 SHEETS



IN STREAM WORK SUMMARY

WORK ITEM	TOTAL AREA(sf)			EXCAVATION					FILL					
				Average Depth (ft)	Volume (cy)				Native Non-Select Material (cy)	Existing Rip Rap (cy)	Imported Large Wood (cy)	Imported Rip Rap (cy)	Imported Rip Rap (cy)	Total Fill
	In Stream	Other	Total		In Stream	Other	Total Excavation		In Stream Permanent				Other	
Log Structures	670	330	1000	1	25	12	37		19		55			74
Roughened Channel	2010	990	3000	1	74	37	111		133			167	33	333
Rock Grade Control Structures	80	40	120	1	3	1	4					7	2	9
TOTALS	2760	1360	4120		102 cy	50 cy	153 cy		381				36	416 cy
Acreage	0.06	0.03	0.09											

GRAPHIC SCALE

10 0 10

(IN FEET)

REGISTERED PROFESSIONAL ENGINEER
OREGON
DECEMBER 31, 1981
GARY A. WILSON
EXPIRES 6/30/2014

FOR DESIGN REVIEW ONLY

REVISIONS	BY

BLM – ALDER CREEK
HEADCUT RESTORATION

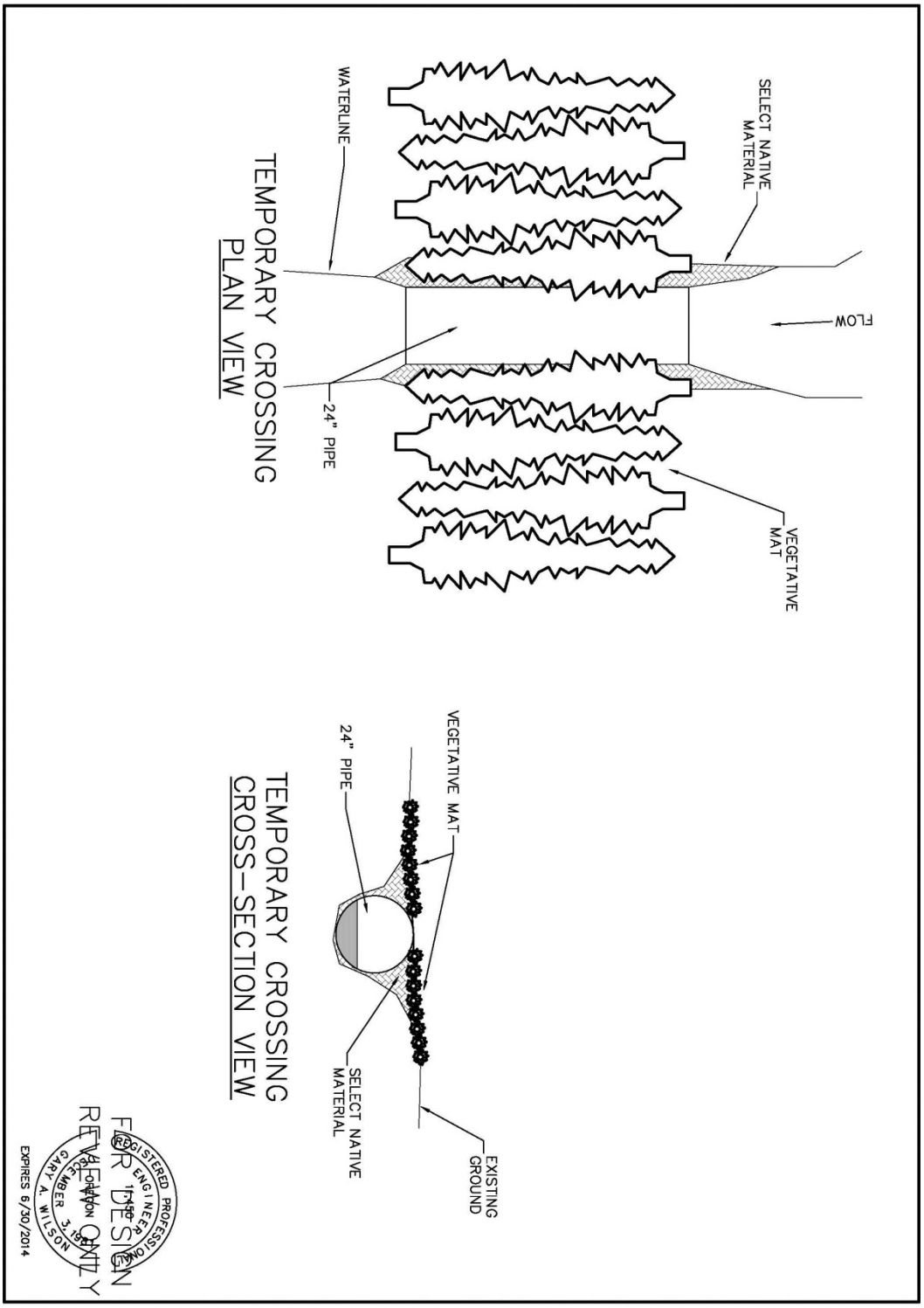
HARNEY COUNTY, OREGON

CONSTRUCTION AREA PLAN

GRANT SOIL AND WATER CONSERVATION DISTRICT
721 S. CANYON BLVD.
JOHN DAY, OREGON 97845
(541) 575-0135

DRAWING: BLM-ALDER-CREEK.dwg

DATE: JAN 2013
SCALE: NOTED
DRAWN: BA
CHECKED: GW
SHEET C10
OF 11 SHEETS


SELECT NATIVE MATERIAL
FLOW
VEGETATIVE MAT
WATERLINE
24" PIPE
TEMPORARY CROSSING
PLAN VIEW
VEGETATIVE MAT
24" PIPE
SELECT NATIVE MATERIAL
EXISTING GROUND
TEMPORARY CROSSING
CROSS-SECTION VIEW
REGISTERED PROFESSIONAL ENGINEER
GARY A. WILSON
FOR DESIGN
REVIEW ONLY
EXPIRES 6/30/2014
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DATE: JAN 2013
SCALE: NOTED
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SHEET C11 OF 11 SHEETS
TEMPORARY CROSSING
PLAN &
CROSS-SECTION
BLM – ALDER CREEK
HEADCUT RESTORATION
HARNEY COUNTY, OREGON
REVISIONS
BY

Appendix C - Summary of Environmental Effects of Use of Herbicides

Table 1: Summary of Environmental Effects of Use of Chlorsulfuron

Resource	Proposed Herbicide: Chlorsulfuron	Target Vegetation	Target Areas
Soils **(BLM 2010a, p. 182)**	*Chlorsulfuron* would be stable in neutral soils throughout the area. As with most biodegradation rates, the higher the pH, the slower the herbicide breaks down. The higher the temperature, soil moisture, organic matter content, and microbial biomass, the faster it breaks down. Chlorsulfuron is only mildly toxic to terrestrial microorganisms and effects are short term (transient) (SERA 2004a). Chlorsulfuron has high soil mobility (low soil adsorption), a 40 day half-life, and is moderately persistent in soil. Degradation is affected by soil pH (high pH translates to slower herbicide degradation) and has potential longevity on alkaline soils. The herbicide can remain active for more than a year, particularly on the slightly (pH 7.4-7.9) and moderately (pH 7.9- 9.4) alkaline soils within the Aridisols, Mollisols, Inceptisols, and Entisols soil orders (Sarmah *et al*. (1999)). Chlorsulfuron has a label advisory for wind erosion. It is registered for use on all land types except forest and where applications are applied directly to water, where surface water is present, or to intertidal areas below the mean high water mark.	Thistles, Mediterannean sage, black henbane, poison hemlock, Dalmatian toadflax, perennial pepperweed, puncturevine, whitetop, and invasive annual broadleaf plants.	Roadsides, Rangelands ROW, Reservoirs, meadows, riparian areas.

Resource	Proposed Herbicide: Chlorsulfuron	Target Vegetation	Target Areas
Water Quality, Riparian, and Wetlands (BLM 2010a, pp. 196 & 212)	*Chlorsulfuron* is persistent and mobile in some soils. In aquatic environments, the environmental fate of chlorsulfuron is related to pH and temperature. Hydrolysis rates are fastest in acidic waters and slower in more alkaline systems (Sarmah and Sabadie 2002). As hydrolysis rates drop, biodegradation becomes the mechanism affecting the breakdown of chlorsulfuron. Aquatic dissipation half-lives from 24 days to more than 365 days have been reported (ENSR 2005c), with a shorter time reported for flooded soil (47 to 86 days) than anaerobic aquatic systems (109 to 263 days; SERA 2004a). Chlorsulfuron is not known to be a groundwater contaminant, but has a high potential to leach into the groundwater. It is effective at low concentrations. Chlorsulfuron could be used to the water's edge in riparian and wetland areas. It will not be used where it could contact the water; therefore the adverse effect would be low to none on water quality. Chlorsulfuron would be an especially effective control for the noxious perennial mustards that are invading the area, such as perennial pepperweed and hoary cress.		
Fish and Other Aquatic Resources (BLM 2010a, p. 224)	Chlorsulfuron is a selective, ALS-inhibitor herbicide. It is not registered for use in aquatic systems. Chlorsulfuron's physical and chemical properties suggest that it is highly soluble in water, and is likely to remain dissolved in water and runoff from soils into water bodies. In addition, this herbicide has a long half-life in ponds, but is not likely to bioconcentrate in aquatic wildlife. However, none of the evaluated scenarios, including accidental direct spray and spill of chlorsulfuron, poses any risk to fish in streams and ponds.		

Resource	Proposed Herbicide: Chlorsulfuron	Target Vegetation	Target Areas
Wildlife and Special Status Wildlife Species **(BLM 2010a, p. 248)**	*Chlorsulfuron* is an ALS-inhibitor; a group of herbicides that has the lowest risk to all groups of wildlife of the herbicides evaluated. All likely application scenarios are below the LOC for wildlife groups under tested scenarios, even under spill or off-site drift scenarios. It is unlikely to cause any adverse effect on aquatic animals (Table 3-14). No studies on amphibians or reptiles were found (SERA 2004a).		
Grazing **(BLM 2010a, p. 261 & 269)**	*Chlorsulfuron* risk quotients for mammals for all modeled scenarios were below the conservative LOC of 0.1, indicating that direct spray and ingestion of sprayed vegetation is not likely to pose a risk to livestock (Table 3-14; ENSR 2005c). Based on label directions, there are no restrictions on livestock use of treated areas which would also be applicable to wild horses.		
Special Status Plant Species and Upland Vegetation **(BLM 2010a, p. 145-146)**	*Chlorsulfuron,* an ALS-Inhibitor and sulfonylurea, works by inhibiting the activity of an enzyme called acetolactate synthase (ALS), which is necessary for plant growth. Chlorsulfuron is effective at very low dosages (half ounce to a few ounces per acre). Because of its high potency and longevity, this herbicide has potential to pose a particular risk to non-target plants. Off-site movement of even small concentrations of this herbicide could result in extensive damage to surrounding plants, and damage to non-target plants has potential to result in concentrations lower than those reportedly required to kill target invasive plants (Fletcher et al. 1996). ALS-inhibiting herbicides can quickly confer resistance to certain weed populations.		

Table 2: Summary of Environmental Effects of Use of Clopyralid

Resource	Proposed Herbicide: Clopyralid	Target Vegetation	Target Areas
Soils **(BLM 2010a, p. 182-184)**	*Clopyralid* is unstable in soil and is considered moderately persistent based on its half-life. Leaching potential within the area would be low since the majority of the soils are loams and clay, although there are some coarser-textured pockets. Biodegradation would be rapid in soil and thus the potential for leaching or runoff is low. Clopyralid can persist in plants and therefore can be introduced into the soil when plants die.	Thistles knapweeds	Roadsides, ROWs, dry meadows, and rangelands
Water Quality, Riparian, and Wetlands (BLM 2010a, pp. 196 & 213)	*Clopyralid* does not appear to bind tightly to soil and will leach under favorable conditions. However, leaching and subsequent contamination of groundwater appear to be minimal (SERA 2004b), which is consistent with a short-term monitoring study of clopyralid in surface water after an aerial application (Rice et al. 1997a cited in SERA 2004b). Clopyralid is not known to be a common groundwater contaminant, and no major off-site movement has been documented. Clopyralid does not bind with suspended particles in water; biodegradation in aquatic sediments is the main pathway for dissipation. The average half-life of clopyralid in water has been measured at 9 and 22 days (Dow AgroSciences 1998). *Clopyralid* is relatively non-toxic to aquatic plants. Overall, effects to non-target wetland and riparian vegetation from normal application of clopyralid are likely to be limited to susceptible plant species in or very near the treatment area, and could be avoided by maintaining an adequate buffer between the treatment area and wetland and riparian areas (SERA 2004b). Clopyralid is not likely to affect aquatic plants via off-site drift or surface runoff pathways unless spilled. More effective noxious weed control would lead to better vegetation cover, which in the long term could assist with better water infiltration.		

Resource	Proposed Herbicide: Clopyralid	Target Vegetation	Target Areas
Fish and Other Aquatic Resources **(BLM 2010a, p. 224)**	No effects would occur as no treatment will take place with this herbicide directly to water or areas where surface water is present within riparian areas or wetlands or where soils have rapid to very rapid permeability throughout the profile (such as loamy sand to sand) .		
Wildlife and Special Status Wildlife Species **(BLM 2010a, p. 248)**	*Clopyralid* is useful in treating starthistle, thistles, and knapweeds, which are noted as damaging to wildlife habitat. Clopyralid is unlikely to pose risk to terrestrial mammals. All of the estimated mammalian acute exposures are below the acute NOEL; mammalian chronic exposures are below the chronic NOEL. It is relatively "harmless" to earthworms (Dow AgroSciences 1998) and 14 of 17 insect parasites and predatory mites (Hassan et al. 1994 cited in SERA 2004b). There was no mortality to bees at relatively high doses. Four of eighteen direct spray scenarios resulted in exposure levels below the estimated NOEL. Large and small birds have some risk of ingestion of contaminated food but hazard quotients are below the level of concern for all exposure scenarios. No studies on amphibians/reptiles were found. Clopyralid is one of the herbicides with lower toxic risks (SERA 2004b).		
Grazing **(BLM 2010a, p. 262)**	*Clopyralid*: Large mammals face low acute risks from direct spray and from consumption of contaminated grass at the typical and maximum application rates. The maximum application rate also poses a low chronic risk to large mammals consuming on-site contaminated vegetation. All risks identified fall within the lowest risk category; adverse effects to livestock are unlikely with expected exposure scenarios. According to label directions, there are no restrictions on grazing or hay harvest following application at labeled rates, but livestock should not be transferred from treated grazing areas to susceptible broadleaf crop areas without first allowing for 7 days of grazing on untreated pasture. Clopyralid would allow for more effective weed control, which could increase the carrying capacity of the treated allotments.		

Resource	Proposed Herbicide: Clopyralid	Target Vegetation	Target Areas
Special Status Plant Species and Upland Vegetation **(BLM 2010a, p. 145)**	*Clopyralid* is a selective herbicide that limits enzyme activity, and focuses on broadleaf weeds and grasses. Clopyralid is more selective and less persistent than picloram. Clopyralid is relatively non-toxic to aquatic plants; however, accidental spills have potential to result in temporary growth inhibition of aquatic plants. Many of our important, desirable tree and shrub species are tolerant of clopyralid. Clopyralid has little effect on grasses and members of the mustard family. Overall effects to non-target plants from normal application of clopyralid would likely be limited to susceptible plant species in or very near the treatment area. Removal of noxious weeds would improve the upland vegetation and allow for more habitats for special status plant species.		

Table 3: Summary of Environmental Effects of Use of Imazapic

Resource	Proposed Herbicide: Imazapic	Target Vegetation	Target Areas
Soils (BLM 2010a, p. 182-184)	*Imazapic* is moderately persistent in soils and has not been found to move laterally with surface water. Most imazapic is lost through biodegradation. Sorption to soil increases with decreasing pH and increasing organic matter and clay content. The project area has relatively high pH and clay content.	Medusahead rye, Cheatgrass, African wiregrass (Ventenata)	Roadsides, Rangelands, ROWs
Water Quality, Riparian, and Wetlands (BLM 2010a, pp. 197 & 212, and 224)	Imazapic has low potential to leach into the groundwater. Imazapic would have very high water solubility and negligible to slight potential for transport in surface runoff, due to its adsorption potential with soil and organic matter. In addition, imazapic is rapidly degraded by sunlight in aqueous solution, with a half-life of one or two days. In aquatic systems, imazapic rapidly photodegrades with a half-life of 1 to 2 days (Tu et al. 2001). Aquatic dissipation half-lives have been reported from 30 days (water column) to 6.7 years in anaerobic sediments (SERA 2004c). Little is known about the occurrence, fate, or transport of imazapic in surface water or groundwater (Battaglin et al. 2000). However, according to the herbicide label for Plateau, in which imazapic is the active ingredient, it is believed to be a groundwater contaminant (BASF 2008). *Imazapic* risk to aquatic plants from accidental spills of imazapic is moderate to high at the maximum application rate and low to moderate at the typical application rate (there is no acute risk to aquatic plants in standing water at the typical application rate). Aquatic plants are generally not at risk from off-site drift of imazapic, except when applied aerially at the maximum application rate with a buffer of 100 feet or less. *Imazapic*, an ALS-inhibitor, is a selective, systemic herbicide. It would not be used for treatment of aquatic vegetation, but could be used in riparian areas. Due to these characteristics and the SOPs that would be employed, impacts to water resources impacts are not anticipated to be significant from proposed imazapic applications.		

Fish and Other Aquatic Resources (BLM 2010a, p. 225)	*Imazapic* would be moderately toxic to fish, but is not proposed for aquatic use. The average half-life for imazapic in a pond is 30 days, and this herbicide has little tendency to bioaccumulate in fish (Barker et al. 1998). According to the manufacturer's label, imazapic has a high runoff potential from soils for several months or more after application. Accidental direct spray and spill scenarios generally pose no risk to fish when imazapic is applied at either the typical or maximum application rate. Risk Assessments show fish are not at risk from off-site drift or surface runoff of imazapic. No treatment will take place directly to water, or to areas where surface water is present with this herbicide. Adjuvants will be used to minimize drift and help bind the herbicide to the site of application.		
Wildlife and Special Status Wildlife Species (BLM 2010a, p. 249)	*Imazapic* is an ALS-inhibitor that rapidly metabolizes and does not bioaccumulate. It is effective against medusahead, leafy spurge, and cheatgrass, which adversely affect wildlife habitat. Imazapic is not highly toxic to most terrestrial animals. Mammals are more susceptible during pregnancy and larger mammals are more susceptible than small mammals. Imazapic has low toxicity to honeybees. No adverse short-term exposure risks to birds were noted for imazapic, but some chronic growth reduction was noted. None of the risk categories for susceptible or non-susceptible shows any ratings that exceed the LOC. Imazapic is one of the lowest toxic risks to wildlife of herbicides evaluated in this EIS along with other ALS-Inhibitors (SERA 2004c). The use in rangeland and other wildlife habitat areas would benefit wildlife by controlling invasive plant species, especially annual grass species, and would promote the establishment and growth of native plant species that provide more suitable wildlife habitat and forage.		

Grazing (BLM 2010a, p. 261)	*Imazapic*: Risk quotients for terrestrial animals were all below the most conservative LOC of 0.1, indicating that direct spray or drift of imazapic would be unlikely to pose a risk to livestock (Table 3-14; ENSR 2005h). Based on label directions, there are no restrictions on livestock use of treated areas. Imazapic will typically be applied in the fall as a pre-emergent, minimizing potential ingestion and therefore effects to the livestock that use the allotment.		
Special Status Plant Species and Upland Vegetation (BLM 2010a, p. 145)	*Imazapic*, an ALS-Inhibitor and sulfonylurea, works by inhibiting the activity of an enzyme called acetolactate synthase (ALS), which is necessary for plant growth. Imazapic would be applied at a very low dose (6-8 ounces per acre). Because of the high potency and longevity, this herbicide can pose a particular risk to non-target plants. Off-site movement of even small concentrations of this herbicide can result in extensive damage to surrounding plants. Since imazapic would be applied early fall most of the native vegetation would be dormant. The key grass species found in the project area are Blue-bunch wheatgrass (*Pseudoroegneria spicata)*, Thurbers needlegrass *(Achnatherum thurberianum)*, squirreltail *(Elymus elymodies)*, Sandberg's bluegrass *(Poa sandbergii)*, Idaho fescue *(Festuca idahoensis)*, crested wheatgrass (*Agropyron cristatum*), basin wildrye *(Elymus cinereus)*, and Inland saltgrass *(Distichlis stricta).* These species would be tolerant to imazapic up to a rate of 12 ounces per acre (which is much higher than the rate we would be applying in the project area).		

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District Office
Three Rivers Resource Area
Finding of No Significant Impact

Alder Creek Restoration
Environmental Assessment
DOI-BLM-OR-B050-2012-0019-EA

INTRODUCTION

The Burns District Bureau of Land Management (BLM) has prepared an Environmental Assessment (EA) proposing to implement an ecological restoration project to address stream channel instability, as evidenced by headcutting along Alder Creek, and juniper encroachment throughout the Alder Creek Pasture of Alder Creek Allotment (#05536). The project would be broken into two related, but distinct segments: A) Channel Restoration and B) Juniper Treatment, each with corresponding weed surveys and treatments.

The project area is located in Harney County approximately 6.5 air miles northeast of Crane, Oregon. It encompasses 7,187 acres and ranges from 4,600 to 5,600 feet elevation (Maps A and B, Statewide and Project Vicinity Maps). No Wilderness Study Areas (WSAs) or Wilderness are present.

SUMMARY OF THE PROPOSED ACTION

The Proposed Action includes stabilization and restoration of a multi-branched headcut within Alder Creek Meadow on Alder Creek and of the smaller headcuts within Alder Creek Pasture of Alder Creek Allotment (#05536). It also includes treating encroached juniper across this pasture. The proposed headcut restoration in the Alder Creek Meadow involves installing a series of rock and earthen check structures leading to a historic berm/beaver dam site - where channel incision initiated. Passage would be targeted for juvenile fish. A long pool would be created above this check structure in the incised channel. A series of log structures would be placed within the pool to provide fish habitat and cover. Live willows and alder would be planted along the incised channel to provide shade and additional cover habitat. This material would be collected locally where possible, or brought in from similar locations. Sedge mats or woody plants would be salvaged from construction activities where possible and used post construction to help rehabilitate disturbed areas. The newly constructed channel would sustain a 100+ year flood event. Following restoration activities, the wetland would be fenced and excluded from livestock grazing.

Where small headcuts exist outside of the meadow, rock or juniper cross vanes would be installed downstream of the headcuts to reduce stream grade, slow water velocity, and reduce erosion at the headcut sites. Work would occur using either tracked excavator or by hand where feasible.

Access to the site would be entirely through public lands. To allow needed equipment to access the site, the tracked excavator used for the project will move impediments to travel (i.e. boulders, juniper) from the existing roadway as it travels to the project site. This would allow project equipment access to the site. No continuous road surface blading is planned. Removal of boulders and juniper would only occur where necessary. Surface disturbance along the access routes would be limited to only those activities necessary for ensuring safe passage of project equipment. Planned work would not alter Maintenance Intensity Level of the access roads, nor would it include any new road construction, realignment, or upgrading of route category.

Encroached juniper within Alder Creek Pasture would be cut and piled or girdled. The primary treatment type would be clear cutting followed by hand or machine piling of slash. Machine or hand piling of juniper cut and leave treatments would also occur where feasible. Cutting of juniper displaying all old growth characteristics would be avoided. Piles would be burned after adequate cure time. Burned areas would be seeded with a seed mix consisting of crested wheatgrass, bluebunch wheat grass, sheep fescue and bottlebrush squirreltail. This pasture is 7,187 acres, of which all 7,187 acres could eventually be treated dependent upon funding. However, priority treatments would be in riparian corridors and Douglas fir (*Pseudotsuga menziesii*), aspen (*Populus tremuloides*), bitterbrush (*Purshia tridentate*), and mountain mahogany (*Cercocarpus ledifolius*) stands.

Restoration activities proposed under this project include survey for and appropriate treatment of noxious weeds found in the Project Area (Alder Creek Pasture - 7,187 acres). This would include the application of herbicides (Imazapic, Chlorsulfuron, Clopyralid).

FINDING OF NO SIGNIFICANT IMPACT

Consideration of the Council on Environmental Quality (CEQ) criteria for significance (40 Code of Federal Regulations [CFR] 1508.27), both with regard to context and intensity of impacts, is described below:

Context

The Proposed Action would occur in the Alder Creek Allotment and would have local impacts on affected interests, lands, and resources similar to and within the scope of those described and considered in the Three Rivers Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) and the 2010 Vegetation Treatments Using Herbicides on BLM Lands in Oregon Record of Decision (ROD). There would be no substantial broad societal or regional impacts not previously considered in these planning documents.

Intensity

Consideration of the CEQ's ten considerations for evaluating intensity (severity of effect) follows:

1. *Impacts that may be both beneficial and adverse.* The EA considered potential beneficial and adverse effects. Project Design Features were incorporated to reduce or eliminate impacts. None of the effects are beyond the range of effects analyzed in the two planning documents cited above.

   Wetlands, Riparian Zones, Water Quality, and Fisheries: This project would stabilize existing headcuts along Alder Creek, arresting their upstream migration. Wet meadow and riparian habitats upstream of any headcut would be preserved. A ponded area would be created within the incised wet meadow channel allowing for slow capture of sediment, eventually resulting in a lower depth to groundwater in areas that have already converted to dry/upland meadow. Lowering the depth to groundwater would allow re-establishment of wetland obligate or facultative plants and eventually recover the wetland acreage lost to channel incision.

   Proposed bank reshaping would reduce sediment entering the channel from incised banks. Sediment entering the channel from the headcut itself would greatly decrease. Short term increases in sediment are expected during construction activities. Construction activities would be isolated, where feasible, from the active flowing stream to minimize disturbance to water quality. However, short term increase in sediment would be expected during periods when in-stream work occurs.

   Reducing competition from juniper in riparian zones should facilitate recovery of deciduous woody and herbaceous riparian communities to a more historic regime. This would improve watershed stability and function by reducing bare soil and sediment inputs, stabilizing banks, increasing infiltration, and maintaining or restoring proper storage and release of groundwater important for late season flows and temperatures.

   Risk to non-target riparian vegetation associated with herbicide use would be minimized by the current stream buffering standards. As long as standard operating procedures (SOP) for stream buffering and chemical application are followed there are no measurable risks to water resources or wetlands/riparian areas.

   Fish: Stabilizing headcuts would stop their upstream migration which would maintain current high quality fish and aquatic habitat within the Alder Creek Meadow. Juniper structures placed within the incised channel would create pool habitat and shade and provide cover from predators for fish and other aquatic life. Live willows and alders planted along the incised channel would provide additional shade and fish cover. The proposed headcut restoration design would not impede fish passage.

   Removal of juniper and pile burning would stimulate regeneration of some riparian species (e.g. aspen) that have become decadent due to fire exclusion; these would

contribute to stream shading and thermal buffering. Some girdled juniper would fall into the stream channel and provide cover and habitat complexity for fish.

Herbicide use within or adjacent to streamside habitat could affect water quality if overspray or spill enters the water. Proper protocols would be followed to reduce the potential for water contamination. The potential for water contamination by herbicide is expected to be low if proper protocols and best management practices (BMP) are followed.

Special Status Species - Columbia Spotted Frog: Alder Creek provides habitat for Columbia spotted frog (*Rana luteiventris*), a BLM designated Special Status Species (SSS) and a United States Fish and Wildlife Service (USFWS) candidate species for listing under the Threatened and Endangered (T & E) Species Act. The proposed action is likely to improve over-all habitat conditions for the Columbia spotted frog, allowing for potential population expansion into the wet meadow and other parts of Alder Creek. Specifically, as the wet meadow and lentic characteristics continue to improve, the breeding, foraging, and hibernating habitat components should all improve, supporting expansion of the Columbia spotted frog population in the project area.

Wildlife: Treatments would reduce juniper cover and cause an increase in grasses, forbs, and shrubby browse species increasing health, vigor, and palatability of forage for deer, pronghorn, and elk that use the area. Creating or maintaining a mosaic of habitat types from scattered juniper, big sagebrush, low sagebrush, and bitterbrush stands across the project area is expected to enhance wildlife habitat and increase species diversity. Cut juniper may provide cover for some wildlife species, such as small mammals. Disturbance during project implementation (stream restoration and juniper and weed treatments) would cause short-term displacement of deer and other wildlife in the immediate project area.

Migratory Birds: Removal of substantial amounts of juniper could have negative impacts to migratory species associated with woodlands. However, a substantial amount of juniper exists all around the project area. Habitats containing juniper trees are not considered unique or limited in the area. Sagebrush and grassland associated species would likely benefit from the proposed action. Increasing the amount of groundwater should facilitate riparian woody species expansion and persistence, which would provide nesting and roosting structures. The combination of the proposed action with present and reasonably foreseeable future actions (RFFA) in the area is not expected to substantially affect migratory birds.

Herbicide spraying would not cause ground disturbance and it would not affect migratory bird habitat. Potential noise and visual disturbance associated with the application of herbicides may cause temporary displacement or alter the activity level or behavior of some birds. However, treatments would occur at a time of year when most birds have migrated out of the area, and birds that remain are highly mobile and able to leave the immediate area. Disturbance effects from spraying would be negligible on bird populations due to the relatively small amount of area being treated within the pasture,

and the brief (a few hours) amount of time required to apply the herbicide. Most birds would return to the area or resume activity once spraying is complete.

Vegetation: Project work would occur, most likely, between October and November, making impacts to upland vegetation non-measurable since most vegetation will be dormant or have already reached seed set and have senesced. The impact to remaining vegetation at the site would be less due to tracked machines distributing the weight of the machine and a load over steel or rubber tracks resulting in lower ground pressures than other equipment (Blinn et al., 1998). Impacts would be further minimized by performing work when soils are the least saturated. Disturbed areas would be reseeded, promoting recovery.

Removal of encroached juniper would help to reestablish appropriate sagebrush plant communities. Cutting juniper would help to increase soil resources (water and nutrients) for residual grasses, forbs, and shrubs.

Treating noxious weeds with additional herbicides would benefit upland vegetation by allowing the most effective chemical weed treatments in areas of existing and future vegetation disturbance. Treating noxious weeds in these areas would promote and maintain the abundance of native and desired introduced vegetation. Plateau (Imazapic) would be the only herbicide applied aerially to treat medusahead infestations. This herbicide has been shown to selectively treat medusahead rye and cheatgrass leaving desirable perennial vegetation unharmed. The other herbicides analyzed would be used at a small scale (spot treatments) and applied with ground equipment.

Forestry and Woodlands: Removal of encroached juniper would restore the site to its historic structure of open woodland.

Weed treatments and headcut restoration activities would have no effect on woodlands.

Air Quality: The proposed action would produce smoke from slash pile burning and, to a lesser degree, dust from mechanical treatments. The nearest Federal Class 1 Airshed - Strawberry Mountain Wilderness - is unlikely to be impacted by this project due to the remote distance and smoke dispersion.

Fire Management: The Proposed Action would reduce intensity and severity of wildfires and risk to firefighters by altering the continuity of fuels in the project area. Reducing fuel across the landscape would help meet National Fire Plan goals.

Noxious Weeds: The proposed action would raise the water table in the meadow, reducing the areas of dry, unstable benches, and encouraging sustainable riparian vegetation communities along the creek. This competitive vegetation would reduce opportunities for noxious weed establishment and spread.

Adherence to BMP’s and Project Design Elements (PDE) outlined in the EA would minimize the potential for project introduction of additional noxious and invasive weeds.

Where herbicide treatments are necessary, using these new products, either alone or in combination with our currently available products, will provide us the best tools available to ensure effective, timely management of the noxious weeds in the area. By controlling the noxious weeds, we enhance the potential for success of rehabilitation of the project area following potential disturbance.

Soils/Biological Soil Crusts (BSCs): Heavy equipment would be utilized in the headcut restoration. Tracked machines would be used, reducing impacts to soils and any BSCs that may be at the site. It is unlikely juniper treatments would affect BSCs as they generally do not occur under juniper canopy. Weed treatments would not have measurable impacts to soils. There is no reliable research which has determined what impacts, if any, there would be to biological soil crusts.

Recreation: There would be short-term impacts to a small number of visitors during treatment periods, particularly when treatments are during fall hunting seasons (when most visitations occur). Smoke, dust, noise, and vehicle traffic related to construction or juniper treatments would temporarily discourage users from entering or remaining in the vicinity. Over the long-term, visitor use would not be expected to be negatively affected and recreational activities related to big game hunting and wildlife viewing should be enhanced as habitat function and landscape diversity are expected to improve over time.

The application of specific herbicides within the project area would have no measureable direct impacts to recreational opportunities.

2. *Degree to which the Proposed Action affects public health and safety*. No aspect of the Proposed Action or alternative would have an effect on public health and safety.

3. *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.* The Alder Creek Wet Meadow (wetland) is within the Project Area. See number 1 for wetland discussion.

4. *The degree to which effects on the quality of the human environment are likely to be highly controversial.* Controversy in this context means disagreement about the nature of the effects, not expressions of opposition to the Proposed Action or preference among the alternatives. No unique or appreciable scientific controversy has been identified regarding the effects of the Proposed Action or alternative.

5. *Degree to which possible effects on the human environment are highly uncertain or involve unique or unknown risks.* The analysis has not shown there would be any unique or unknown risks to the human environment nor were any identified in the Three Rivers PRMP/FEIS or the Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD.

6. *Degree to which the action may establish a precedent for future actions with significant impacts or represents a decision in principle about a future consideration.* This project

neither establishes a precedent nor represents a decision in principle about future actions. No long-term commitment of resources causing significant impacts was noted in the EA or RMPs.

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.* The EA did not reveal any cumulative effects beyond those analyzed in previous planning documents. The EA described the current state of the environment (Affected Environment by Resource, Chapter III) which included the effects of past actions, and included analysis of reasonably foreseeable future actions identified in the project area.

8. *Degree to which the action may adversely affect districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places.* There are no known features within the Project Area listed or eligible for listing in the National Register of Historic Places.

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat.* There are no known T & E species or their habitat affected by the Proposed Action or alternative.

10. *Whether an action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.* The Proposed Action does not threaten to violate any law. The Proposed Action is in compliance with the Three Rivers RMP and Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD, which provide direction for the protection of the environment on public lands.

On the basis of the information contained in the EA and all other information available to me, it is my determination that:

1. The implementation of the Proposed Action or alternative will not have significant environmental impacts beyond those already addressed in the Three Rivers PRMP/FEIS (September 1991) and the Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD (2010);

2. The Proposed Action and alternative are in conformance with the Three Rivers PRMP/FEIS (September 1991) and the Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD (2010);

3. There would be no adverse societal or regional impacts and no adverse impacts to affected interests; and

4. The environmental effects, together with the proposed Project Design Features, against the tests of significance found at 40 CFR 1508.27 do not constitute a major Federal action having a significant effect on the human environment.

Therefore, an Environmental Impact Statement (EIS) is not necessary and will not be prepared.

Richard Roy Three Rivers Resource Area Field Manager	Date