U.S. Department of the Interior
Bureau of Land Management

Livestock Trailing Programmatic EA

Environmental Assessment

DOI-BLM-NV-E000-2017-0016-EA

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1. Introduction

This Programmatic Environmental Assessment (PEA) has been prepared to disclose and analyze the environmental effects of the Proposed Action and alternatives, and will assist the Bureau of Land Management (BLM) Elko District Office (EDO), Wells Field Office and Tuscarora Field Office (FOs) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any significant effects could result from the analyzed actions. Following the requirements of NEPA (40 CFR 1508.9 (a)), this PEA describes the potential impacts of a No Action alternative and the Proposed Action, as well as consideration of a third alternative. If the BLM determines that the Proposed Action is not expected to have significant effects, a Finding of No Significant Impact (FONSI) will be issued and a Decision Record will be prepared. If significant effects are anticipated, the BLM will prepare an Environmental Impact Statement.

1.1. Background

The FOs receive livestock trailing applications from operators requesting to trail across public lands that the operators do not hold a permit for (referred to as trailing applications from here on for clarity). These trailing applications are subject to NEPA review and must processed be in compliance with the regulations, specifically 43 Code of Federal Regulation (CFR) 4100.

Trailing applications may be approved by the authorized officer by issuing a crossing permit under 43 CFR 4130.6; prior to approval, the authorized officer must consult, cooperate, and coordinate as described at 43 CFR 4130.2; a decision to approve the application must then be issued in accordance with 43 CFR 4160. This process can take 60 to 90 days.

The three most common options for NEPA review are a Categorical Exclusion (CX), Determination of NEPA Adequacy (DNA), and Environmental Assessment (EA). CXs are categories of actions the Federal agencies have determined do not have a significant effect on the quality of the human environment (individually or cumulatively) and for which, therefore, an EA or Environmental Impact Statement (EIS) is not required. There is a CX for livestock trailing, however in order for this CX to be a viable option, extraordinary circumstances must not apply. Extraordinary circumstances include significant impacts to cultural resources, Threatened or Endangered species or migratory birds, and contribution to the introduction, continued existence or spread of noxious weeds or non-native invasive species. The EDO has many resources that could potentially be affected by livestock trailing, resulting in extraordinary circumstances and precluding the use of the livestock trailing CX. DNAs are a documented review of existing NEPA documents (EAs and/or EISs) that confirm an action is adequately analyzed in existing NEPA document(s) and is in conformance with the land use plan. Unfortunately, the EDO and FOs don't have any current NEPA analysis for livestock trailing that could be used as a basis for a DNA. A CX or DNA can usually be completed in 30-90 days depending on complexity, workload and priorities. The EA process requires public involvement, involves the possible development of alternatives to the proposed action, and analysis of direct, indirect and cumulative effects (BLM 2008). The EA process timeline can vary greatly, as completion has historically taken from 6 months to over a year.

This PEA was proposed to provide a means to address extraordinary circumstances while providing a way to process trailing applications in a timely manner; the PEA would serve as current NEPA analysis for the

basis of trailing application DNAs, as well as provide a standard set of stipulations for application across the EDO. In instances where the livestock trailing CX can be used, the stipulations would also be applied when appropriate.

1.2. Location of Proposed Action

The Proposed Action and Alternatives would occur within and include all lands administered by the BLM in the EDO boundary. The EDO manages approximately 7.4 million acres of public land within Elko, Eureka, and Lander Counties in Nevada, which is administered in two FOs (Map 1).

1.3. Purpose and Need for Action

The need for the action is to process livestock crossing applications not already covered under an existing grazing authorization in a timely manner. The purpose for the action is to determine the stipulations under which livestock trailing could occur while minimizing impacts to natural and cultural resources.

The decision to be made is whether or not to make the stipulations analyzed a standard set to select from for implementation when processing crossing applications.

1.4. Land Use Plan Conformance

The Proposed Action and Alternatives described below are in conformance with the following plans:

- Wells Resource Management Plan (RMP), 1985
- Wells RMP Wild Horse Amendment, 1992
- Wells RMP Elk Amendment, 1996
- Elko Resource Management Plan, 1987
- Elko RMP Wild Horse Amendment, 2003
- Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA), 2015

1.5. Relationship to Other Laws, Policies and Plans

The Federal Lands Policy Management Act (FLPMA) and its implementing regulations provide the legal framework within which the BLM manages public lands and assesses the effects of its management actions. Review and possible authorization of the Proposed Action is also subject to requirements for consistency and conformance with a number of other applicable federal laws, regulations, and policies. Table 1. Supplemental Authorities and Resource Review for Analysis summarizes most of the other federal laws, regulations, and policies relevant to the Proposed Action and Alternatives.

1.6. Issues Identified Through Scoping

A 30-day public scoping period was initiated for the Livestock Trailing PEA on June 16, 2017. The EDO received 16 unique comment letters via a combination of email, fax and postal mail. The issues identified for consideration include the following:

- Trailing is an essential element of livestock operations.
    - Trailing through/from/to EDO and continuity with other districts.
    - Appropriate trailing practices
    - Speed of travel and variation due to topography, time of year and weather
    - Rest periods
    - Bedding areas
    - Providing food and water
- Issuing permits
    - Where permit would/would not be required
    - Qualified applicants in accordance with regulations
    - Animal Unit Months (AUMs)
- Coordination with existing permittees
- Trucking livestock
    - Economic impacts
    - Inaccessibility of areas to semi-trucks
    - Stressful to livestock
- Impacts to riparian areas, lentic/lotic systems
- Impacts to Lahontan cutthroat trout (LCT) and other stream organisms
- Impacts to special status plants
- Impacts to sage-grouse
- Impacts/threat to bighorn sheep
    - Effective separation
    - Minimize risk of contact
- Water use must comply with Nevada water laws

2. Proposed Action and Alternatives

2.1. Introduction

Alternatives were developed based upon issues identified through internal and public scoping. The alternatives were designed to address one or more of the identified issues as well as provide the opportunity for specific comparisons on which to base a decision. The maps that are discussed in this document can be found in Appendix A.

2.1.1. Common Definitions

Bedding Area – Up to 40-acre area where livestock water and overnight during multi-day trailing events.

Corridor - A passageway used by livestock to trail from one area to another. These routes shall be less than ¼ mile on either side, or ½ mile total in width.

Cross-country - Not associated with a road of any sort.

Crossing Permit - A written permit authorizing livestock to trail across BLM-administered land, or other land under BLM control, where the applicant does not have authorized use or the trailing would occur outside their authorized use period. A crossing permit includes a specified timeframe, a defined route, and other terms and conditions to meet resource objectives (43 CFR 4130.6-3).

Holdover Area- Areas where livestock and associated vehicles and equipment congregate for a period of time, e.g. bedding areas, staging sites, watering sites, and temporary camps.

Improved Road - Roads with applications intended to harden the surface (e.g. gravel, asphalt). Improved roads are maintained for the purpose of motor vehicle travel. These roads typically have a formal name that is widely accepted (e.g., Charleston Road, Rock Springs Road, and Ruby Valley Road).

Livestock - Any species of domesticated animal normally raised on a farm such as cattle, sheep, horses, goats, and other domestic animals (29 CFR 780.328).

Livestock Guardian Dogs (LGDs) – Large domestic dogs specifically bred and trained to live with and protect herds of sheep or goats.

Previously disturbed sites- An area with prior disturbance such as stock ponds, troughs, historic salting locations, existing shipping sites, or known unimproved camping areas.

Project Area - The project area totals 12,183,246.44 acres and includes all BLM-administered lands located within in the EDO boundary (Map 1).

Riparian Area - Vegetation, habitats, or ecosystems that are associated with bodies of water (e.g., streams or lakes) or are dependent on the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage (e.g., springs).

Supplemental Feed- a feed which supplements the forage available from public lands and is provided to improve livestock nutrition or rangeland management.

Trailing - Livestock walking from one location to another under the control of one or more herders.

Unimproved Road - Roads that could accommodate a motor vehicle but are not surfaced or maintained expressly for motor vehicle travel. These roads are typically not named but often appear on United States Geological Survey (USGS) 7.5 minute quadrangle maps (e.g., jeep trails, two-track routes).

2.2. Alternatives Considered but Eliminated from Detailed Analysis

2.2.1. Trailing only on roads

The BLM considered an alternative that would require livestock to trail solely on existing roads and trails. This alternative was eliminated from further analysis because it has the same components as Alternative 1, such as no cross-country trailing across BLM-administered lands and the use of roads for trailing, and would have similar, if not the same, effects. In addition, some areas requiring trailing to gain access to authorized grazing areas are roadless.

2.2.2. Trucking of Livestock

Trucking livestock to and from permitted allotments was considered as a stand-alone alternative. However, BLM eliminated this alternative from detailed analysis because trucking would be a likely result of Alternative 1 and would be analyzed under that alternative. For example, some of the considerations related to trucking that are common to both the eliminated alternative and Alternative 1 include that many areas are roadless or inaccessible to trucking; higher costs of trucking may not be feasible for permittees; and in the case of sheep, it is not feasible to truck ewes with young lambs in the spring because the newborn lambs are highly susceptible to trampling death during trucking.

2.3. Description of Proposed Action and Alternatives

2.3.1. Alternative 1 – No Crossing Permits Authorized

Applications received in accordance with 43 CFR 4130.1-1 and 4130.6-3 for crossing permits to trail livestock on BLM-administered lands would be denied by decision in accordance with 43 CFR 4160. No cross-country trailing of livestock across BLM-administered lands within the EDO would be authorized. Under this alternative, it is assumed applicants would find alternate means to transport their livestock other than trailing cross-country across BLM-administered land. Livestock could be trailed on non-BLM roads, publically maintained roads (on roadway only where road passes through BLM-administered lands), State managed lands, or on private lands. Livestock could be trailed during authorized use periods, without a crossing permit, between pastures within an allotment or between adjacent allotments for which a permittee has authorized use.

2.3.2. Alternative 2 – No Action

Under the No Action Alternative crossing permits applications would be considered and potentially authorized. The timeframes for completion of NEPA and level of analysis (ranging from none completed to CX to EA) would vary greatly based on staff availability, workload, and the complexity of issues to be analyzed; in-depth NEPA analysis would most likely not be completed in time to authorize the crossing permit before the trailing would need to occur. Stipulations included as terms and conditions and for management and protection of resources may or may not be developed and applied to crossing permits on a case-by-case basis and may vary across authorizations. Operators would be billed for AUMs used during the trailing period.

2.3.3. Alternative 3 - Proposed Action

Under the Proposed Action resource-specific stipulations would be applied where appropriate as terms and conditions for trailing livestock, authorized under crossing permits, within the project area. The crossing permits (aka trailing permits) would be authorized for a period of up to 10 years; however, resource considerations could result in shorter periods. BLM staff would review the submitted applications and if necessary make resource-based modifications and/or reductions in coordination with the applicant to minimize resource conflicts. Alternate routes may be authorized for use based on uncommon circumstances (e.g. flooding or fire), resource concerns, or a change in the livestock operator's destination. Resource-specific terms and conditions would also apply to alternate routes. The required terms and conditions would eliminate or reduce impacts to Special Status Species and their habitats, wildlife, and cultural sites eligible for the National Register of Historic Places, and encourage maintenance of or progress toward Standards and Guidelines for Rangeland Health in Nevada's Northeastern Great Basin Area.

<u>Notifications for Applicants</u>

- New applicants for a crossing permit must provide a complete application a minimum of 90 days prior to the intended trailing to allow for adequate assessment of potential resource impacts and compliance with applicable laws and regulations. A complete application includes, but is not limited to, a completed Form 4130-1 Grazing Application and a map showing proposed route(s), staging areas, camp locations, livestock holdover locations, and natural watering and water haul locations.
- An existing crossing permit holder shall submit an application to the BLM a minimum of two weeks prior to desired trailing, allowing BLM to make adjustments, if needed, due to unforeseen or new resource concerns.
- It is the responsibility of the trailing permittee to gain approval from the land owner or land manager prior to trailing or bedding livestock anywhere that is not BLM-administered land.
- It is the responsibility of the crossing permit holder to ensure compliance with State of Nevada water laws.
- Crossing permit holder will notify grazing permittees a minimum of 24 hours prior to trailing through the permittee's assigned grazing allotment(s).
- Crossing permit holders will be billed for AUMs based on the approved application; a bill must be issued by BLM prior to trailing.
- 15 days following the conclusion of trailing activities, the crossing permit holder shall submit Form 4130-5 Actual Grazing Use Report to the authorizing office.
- Crossing permit holders will record (e.g. on paper maps or GPS) trailing routes and holdover locations, and provide data to BLM with Actual Grazing Use Report.
- The allotment(s) listed on the crossing/trailing permit are subject to requirements 43 CFR 4180 – Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration. The permit shall be modified, if necessary, to meet these requirements upon completion of a Standards and Guidelines Assessment and Determination.
- Any conflicts that occur due to livestock mixing are the responsibility of the crossing permit holder to mitigate and resolve in cooperation with the grazing permittee.
- Per 43 CFR 4130.6, crossing permits have no priority for renewal and cannot be transferred or assigned.
- Individual trailing permits may be subject to additional stipulations on a case-by-case basis.

General Stipulations would apply to all routes, as appropriate:

- Trailing will occur on improved or unimproved roads whenever possible (except when crossing a paved road) and will be conducted in a manner to minimize congestion of roadways or causing a hazard to motorized vehicles. Trailing will be avoided on improved or unimproved roads during times when soils are saturated. Cross-country travel by livestock will only be authorized if the area does not have an existing road.
- Trailing will be active, with livestock continually moving toward their final destination except during rest periods and at night. This movement may be facilitated by non-motorized (e.g. horses, dogs) or motorized (e.g. all-terrain vehicles, motorcycles collectively referred to as off-highway vehicles or OHV) methods. Sheep may use up to two rest periods during the day consisting of one hour each. Any livestock watering from natural sources must be moved off of the area immediately after drinking.
- Crossing permit holder will notify BLM authorized officer within 24 hours of any unforeseen circumstances which delay trailing operations.
- Overnighting will occur only at locations previously approved by BLM to allow for screening to address cultural or resource concerns. No overnighting is allowed within 1 mile of any streams, springs, seeps or aspen stands.
- Load and unload all equipment on existing roads.
- Avoid staging, overnighting, travel through and activities in weed infestations.
- Supplemental feeding of forage to trailed livestock may be authorized on a case by case basis.
- Supplemental feeding of forage to livestock during trailing activities, including feeding of horses used for the purpose of herding, will use certified noxious-weed-free forage to prevent the introduction and spread of noxious weeds on BLM-administered public lands.
- Temporary water hauls may be authorized on a case by case basis as part of the trailing application. Water haul sites consist of livestock water troughs of various size and material with wildlife escape ramps installed; troughs are filled with water transported by vehicle to the site; and will be removed within 24 hours following trailing.
- Locate supplemental feed, temporary watering, and staging facilities (e.g., temporary corrals and chutes) on previously disturbed sites free of invasive or noxious plant species at least 1 mile from riparian areas, springs, meadows and playas, aspen stands and not within intact sagebrush stands.
- Crossing permit holder shall remove all debris, solid waste, putrescible wastes and other potential anthropogenic subsidies associated with sheep herder camps, overnight locations and other associated activities.
- The crossing permit holder will report any release of toxic substances (leaks, spills, etc.) to the BLM authorized officer within 24 hours of occurrence.
- The crossing permit holder shall maintain the crossing and congregation areas in a safe, usable condition and provide for the safety of the public entering the area; this may include signage or flaggers as necessary.
- Where recreationists are likely to be present, permittee shall flag or post temporary route signage indicating the possible presence of Livestock Guardian Dogs (LGDs) and prevent possible conflict between the dogs and members of the public. Permittee may need to temporarily control/restrain LGDs until members of the public have left the area.
- Permittee shall not use campgrounds or special designation areas as holdover areas (e.g. Area of Critical Environmental Concern, Special Recreation Management Areas).
- Operators shall avoid bedding animals overnight within 1/4 mile of public's campsites in areas of dispersed camping.

- Vehicles supporting operators trailing livestock in WSAs shall be restricted to "cherry stemmed" or authorized existing routes. No motorized travel cross-country or on trespass roads will be authorized within WSAs. Operators shall avoid bedding animals overnight if possible in WSAs.
- Any horses used in trailing shall comply with 4130.7 CFR (b) and adhere to Nevada State health requirements per NRS 571.210 and identification/brand requirements per NRS 564 and NRS 565.
- Vehicles, including UTVs and ATVs, shall be cleaned of mud, debris, and plant parts prior to on-site arrival. Cleaning efforts will concentrate on tracks, feet, or tires and the undercarriage with special emphasis on axles, frames, cross members, motor mounts, the underside of running boards and front bumper/brush guard assemblies. A high pressure wash is the preferred method for cleaning.
- For any identified Native American human remains, funerary items, sacred objects, or objects of cultural patrimony, the permittee shall stop activities in the immediate vicinity of the discovery and notify the BLM authorized officer immediately.
- Trailing and holdover areas shall not occur in burned areas that have been temporarily closed to grazing until ESR or other treatment objectives are met.
- During the sage-grouse lekking season (March 1 to May 15), avoid trailing and associated activities (e.g., bedding areas and sheep camps) within one mile of active and pending sage-grouse leks. If not feasible, livestock trailing in the one-mile buffer shall not occur from 6:00pm to 9:00am.
- Avoid trailing in sage-grouse seasonal habitats as defined in the Greater sage-grouse ARMPA:
    - Nesting – April 1 to June 30
    - Early brood-rearing – May 15 to June 15
    - Late brood-rearing – June 15 to September 15
    - Winter – November 1 to February 28
- For Special Status and other raptors, the following spatial buffers and seasonal timing restrictions may apply to documented active nest sites contained in the most current NDOW raptor nest database (buffer distances may be reduced or eliminated depending on topography or other factors):

Species	Seasonal Buffer[1]	Spatial Buffer[1] (miles)
Turkey Vulture	3/1[2] – 8/15	0.5
Osprey	4/1-8/31	0.5
Northern Harrier	4/1 – 8/15	0.5
Golden Eagle	1/1 – 8/31	0.5
Bald Eagle	1/1 – 8/31	1.0
Northern Goshawk	3/1 – 8/15	0.5
Cooper's Hawk	3/15 – 8/31	0.5
Sharp-shinned Hawk	3/15 – 8/31	0.5
Red-tailed Hawk	3/15 – 8/15	0.5
Swainson's Hawk	3/1 – 8/31	0.5
Ferruginous Hawk	3/1 – 8/1	0.5
American Kestrel	4/1 – 8/15	0.125[3]
Merlin	4/1-8/31	0.5
Prairie Falcon	4/1 – 8/31	0.25
Peregrine Falcon	2/1 – 8/31	1.0
Barn Owl	2/1 – 9/15	0.125[3]
Long-eared Owl	2/1 – 8/15	0.25

Short-eared Owl	3/1 – 8/1	0.25
Flammulated Owl	4/1 – 9/30	0.25
Western Screech-owl	3/1 – 8/15	0.25
Great Horned Owl	12/1 – 9/30	0.25
Northern Pygmy Owl	4/1 – 8/1	0.25
Burrowing Owl	3/1 – 8/31	0.25
Northern Saw-whet Owl	3/1 – 8/31	0.25

[1]Romin, L.A. and J.A. Muck. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. USFWS, Salt Lake Field Office, Salt Lake City, UT.
[2] Herron, G.B., C.A. Mortimore, and M.S. Rawlings. 1985. Nevada Raptors: Their Biology and Management. Nevada Department of Wildlife, Biological Bulletin No 8, Reno, NV.
[3]Romin and Muck (2002, above) did not recommend a specific spatial buffer due to apparent high population densities and ability to adapt to human activity. However, Elko BLM recommends a spatial buffer because of the remote nature of many raptor nest sites in Nevada and the likelihood that they would not be conditioned to human activities.

BLM Application Review Parameters

- No domestic horse trailing would be allowed within Herd Management Areas (HMAs) (43 CFR 4710.5(b)) BLM Handbook H-4700-1.
- Minimize weed seed transport to relatively weed-free areas: in areas that have both weed infested and relatively weed-free areas, avoid animal movement from infested to non-infested areas; and to the extent possible prevent movement from infested to non-infested areas after weed seed set.
- Review trailing routes to avoid active and ongoing exploration and mining/production operations, including haul roads (active or inactive). Review permits annually to determine if any new exploration or mining/production operations have developed along the authorized route.
- Review the proposed trail routes to determine if there are any known abandoned mines along the path. Notify permittee of the risks and dangers of trailing around old mining districts.
- Livestock crossing permits routes shall not be authorized through an ACEC to protect the resource.
- Locate congregation areas in previously disturbed areas. If it is not possible to use a previously disturbed area, then a full Class III cultural resources inventory shall be conducted in the proposed congregation location to ensure no adverse effect to historic properties.
- Congregation areas will be placed to avoid historic properties.
- Trailing will not be permitted on any National Historic Trails. Congregation areas will not be permitted within 0.5 miles of any National Historic Trails.
- Trailing will only be permitted on historic roads (e.g. the Lincoln Highway) on a case-by-case basis if it can be demonstrated that there is no adverse effect.
- Any paleontological resources identified as part of the permit application process are subject to the Paleontological Resources Protection Act and will be avoided.
- Avoid pastures with riparian habitat that does not meet or is not showing progress toward meeting Nevada's Northeastern Great Basin Resource Advisory Council Standard 2 for Riparian and Wetland Sites.
- Livestock trailing will be avoided where it has the potential to affect occupied Special Status Species (SSS) habitat.
- Livestock trailing on routes in or adjacent to vegetation treatments (e.g., fuels projects or restoration treatments) will be kept on the route unless the specific trailing event will conflict with treatment objectives. Alternate routes will be required if any conflicts exist.

- Trailing shall avoid known element occurrences of Special Status plant species (e.g., grimy mousetails [*Ivesia rhypara* var. *rhypara*] and Goose Creek milkvetch [*Astragalus anserinus*]).
- Evaluate individual crossing permit applications for domestic sheep and goats for potential impacts to bighorn sheep, in consultation with Nevada Department of Wildlife and in accordance with BLM Manual 1730 – Management of Domestic Sheep and Goats to Sustain Wild Sheep (2016).
- If habitat is occupied or critical habitat is designated for proposed for species listed under the Endangered Species Act, consult with U.S. Fish and Wildlife Service (USFWS) to determine if proposed or existing crossing permits will impact such habitat, and if appropriate, determine effective mitigation measures. The Section 7 consultation process under the Endangered Species Act can take more than six months to complete.
- Livestock trailing/crossing will not occur inside exclosures containing occupied Lahontan cutthroat trout (LCT) streams.
- Avoid fording occupied LCT streams during spawning to after the hatching period from April 1st to September 15th; timing depends on stream flow, elevation, and water temperature to avoid direct impacts to active LCT redds (Coffin & Cowan 1995). Livestock crossing will only be allowed after the stream was verified to have no redds at the crossing point.
- All actions associated with permitted trailing shall conform to the Required Design Features contained in the Greater Sage-Grouse ARMPA, Appendix C.

<u>Monitoring</u>

- Conduct weed inventory and assess treatment needs on trailing routes and sites the following growing season to detect noxious and invasive weeds.
- Monitor pastures and riparian areas before and after trailing.

3. Affected Environment/ Environmental Effects

3.1. Basis for Analysis

Appendix 1 of BLM's NEPA Handbook (H-1790-1) identifies supplemental authorities that are subject to requirements specified by statute or executive order and must be considered in all BLM environmental documents (BLM 2008). Other resources or uses potentially impacted by the planned alternatives have also been evaluated. Table 1. Supplemental Authorities and Resource Review for Analysis summarizes these data; Table 2. Timeframes for Cumulative Effects Analysis provides definitions and rationale for selection of timeframes for cumulative effects analysis and Table 3 summarizes the past, present and reasonably foreseeable future actions (PPRFFAs).

3.1.1. Supplemental Authorities

Table 1. Supplemental Authorities and Resource Review for Analysis

Resource	Not Present	Present, Not Affected	Present, Possibly Affected	Rationale for Determination
Supplemental Authorities				
Air Quality *(The Clean Air Act of 1955, as amended)*		X		The alternatives presented would produce no substantive change in impacts to air quality. Air Quality was not identified as a potentially significant issue, therefore it is not brought forward for analysis.
Areas of Critical Environmental Concern *(FLPMA of 1976)*		X		The EDO has one ACEC; it is bounded on one side by restricted access military lands. Due to the proximity of the ACEC to military lands and topographic limitations, the ACEC would not be affected under any of the alternatives; the stipulation in the Proposed Action to not authorize crossing permits in an ACEC further reduces the possibility of being affected. ACECs were not identified as a potentially significant issue, therefore are not brought forward for analysis.
Cultural Resources *(NHPA of 1966, as amended)*			X	Analyzed in Section 3.2.2.
Environmental Justice *(Executive Order 12898)*		X		The alternatives presented would have no disproportionately high or adverse human health or environmental effects on minority and/or low-income populations. Environmental Justice was not identified as a potentially significant issue, therefore it is not brought forward for analysis.
Farmlands (Prime & Unique) *(Surface Mining Control and Reclamation Act of 1977)*	X			The proposed project area does not support any classified farmlands (prime or unique) that may be affected by the Proposed Action or alternatives.
Floodplains *(Executive Order 11988)*	X			There are no floodplains within the proposed project area.
Noxious and Non-Native, Invasive Weeds			X	Analyzed in Section 3.2.9.

Resource	Not Present	Present, Not Affected	Present, Possibly Affected	Rationale for Determination
(Federal Noxious Weed Act of 1974, as amended)				
Native American Religious Concerns *(Executive Order 13007)*	X			No Native American Religious Concerns are known in the area, and none have been noted by Tribal authorities. Should recommended inventories or future consultations with Tribal authorities reveal the existence of such sensitive properties, appropriate mitigation and/or protection measures may be undertaken.
Threatened, Endangered, or Candidate Plant Species *(ESA of 1973, as amended)*			X	Analyzed in Section 3.2.11.
Threatened, Endangered, or Candidate Animal Species *(ESA of 1973, as amended)*			X	Analyzed in Section 3.2.10 and 3.2.11.
Wastes (hazardous or solid) *(Resource Conservation and Recovery Act of 1976, and Comprehensive Environmental Response, Compensation, and Liability Act of 1980)*	X			There are no known hazardous or solid wastes located in the proposed project area.
Water Quality (drinking/ground) *(Safe Drinking Water Act of 1974, as amended and Clean Water Act of 1977)*			X	Analyzed in Section 3.2.4.
Wetlands / Riparian Zones *(Executive Order 11990)*			X	Analyzed in Section 3.2.10. The proposed project area does not support any jurisdictional wetlands but has riparian areas that may be affected by the Proposed Action.
Wild and Scenic Rivers *(Wild and Scenic Rivers Act of 1968, as amended)*	X			There are no designated Wild and Scenic Rivers within the lands managed by the EDO.
Wilderness *(FLPMA of 1976 and Wilderness Act of 1964)*	X			There are no designated Wilderness areas within the lands managed by the EDO.
Wilderness Study Areas (WSA) *(FLPMA of 1976 and Wilderness Act of 1964)*		X		Grazing Management Operations in WSAs are set out in BLM Manual 6330 and stipulations in the Proposed Action. WSAs were not identified as a potentially significant issue, therefore are not brought forward for analysis.
Resources				
Climate Change		X		There would be negligible to no effect to climate change as actions in the alternatives are already taking place in varying degrees. Climate change was not identified as a potentially significant issue, therefore it is not brought forward for analysis.
Fuels / Fire Management			X	Analyzed in Section 3.2.7.
Fish and Wildlife including Special Status Species other than FWS candidate or listed species, e.g. Migratory birds *(E.O. 13186)*			X	Analyzed in Sections 3.2.10 and 3.2.11.

Resource	Not Present	Present, Not Affected	Present, Possibly Affected	Rationale for Determination
Geology / Mineral Resources/Energy Production		X		These resources were not identified as potentially significant issues, therefore are not brought forward for analysis.
Lands / Access		X		Activities authorized under Lands actions are not impeded by livestock activities and would not be affected by the alternatives; use of roads for access would not be affected by the alternatives. Lands/Access were not identified as potentially significant issues, therefore are not brought forward for analysis.
Livestock Grazing *(TGA of 1934, NEPA of 1969, ESA of 1973, FLMPA of 1976, and PRIA of 1978)*			X	Analyzed in Section 3.2.6.
Paleontology *(Paleontological Resources Protection Act P.L. 111-011, HR 146)*		X		Any paleontological resources identified as part of the permit application process are subject to the Paleontological Resources Protection Act and would be avoided. Paleontology was not identified as a potentially significant issue, therefore is not brought forward for analysis.
Rangeland Health Standards and Guidelines *(43 CFR 4180)*			X	Analyzed in Section 3.2.6.
Recreation			X	Analyzed in Section 3.2.8.
Socioeconomics			X	Analyzed in Section 3.2.1.
Soils			X	Analyzed in Section 3.2.3.
Vegetation including Special Status Plant Species other than FWS candidate or listed species			X	Analyzed in Section 3.2.5 and 3.2.11.
Visual Resource Management (VRM) *(FLPMA 1976, NEPA 1969)*		X		As there would not be any visually contrasting changes made to the landscape under any of the alternatives, VRM was not identified as a potentially significant issue, therefore was not brought forward for analysis.
Wild Horses and Burros *(Wild and Free Roaming Horses and Burros Act of 1971, as amended)*		X		Wild Horses and Burros were not identified as a potentially significant issue, therefore are not brought forward for analysis.
Lands with Wilderness Characteristics (LWC)		X		The land's potential for meeting the requirements for LWC would not be altered under the alternatives; LWC was not identified as a potentially significant issue, therefore was not brought forward for analysis.
Woodland / Forestry		X		The removal or use of forestry products or woodland vegetation is not proposed and will not be affected by the alternatives, therefore Woodland/Forestry is not brought forward for analysis.
GRSG General Habitat Management Area (GHMA)			X	Analyzed in Section 3.2.11.
GRSG Priority Habitat Management Area (PHMA)			X	Analyzed in Section 3.2.11.
GRSG Other Habitat Management Area (OHMA)			X	Analyzed in Section 3.2.11.

3.1.2. Geographic and Temporal Scope

Establishing a geographic scope helps bound the description of the affected environment. The geographic scope, or Cumulative Effects Study Area (CESA), for all resources is the BLM administered lands within the EDO. The EDO boundary was selected as it is appropriate for the scale of the programmatic analysis and resource issues. Timeframes are based on the expected duration of the direct and indirect effects of the alternatives and aid in cumulative effects analysis.

Table 2. Timeframes for Cumulative Effects Analysis

Resource	Short-Term Definition and Rationale	Long-Term Definition and Rationale
Livestock Grazing	Two years or less. Impacts would not alter the natural vegetative community nor ecology for the duration of expected direct and indirect effects from Proposed Action.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects. In addition, livestock grazing permits are issued for periods of 10 years.
Terrestrial Wildlife/Special Status Species	While livestock are present and able to cause direct disturbance to wildlife or habitat. Generally less than 24 hours.	10 years; the maximum potential duration of a trailing permit.
Riparian, Fishery and Aquatic wildlife	2 years; duration of expected direct and indirect effects from Proposed Action.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects.
Vegetation	Two years or less. Impacts would not alter the natural vegetative community nor ecology for the duration of expected direct and indirect effects from Proposed Action.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects. In addition, livestock grazing permits are issued for periods of 10 years.
Water resources	While livestock are present and able to cause direct impact to water resources. Generally less than 24 hours.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects.
Cultural	While livestock are present and able to cause direct and indirect effects to historic properties.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects.
Soils	While livestock are present and able to cause direct disturbance to soil resources	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects.
Noxious and Non-Native, Invasive Weeds	2 years; anticipated timeframe for new weed occurrences (introductions) or spread due to direct and indirect impacts from trailing activities.	10 years; the maximum potential duration of a trailing permit to include all direct and indirect effects.

3.1.3. Past, Present, and Reasonably Foreseeable Future Actions

Table 3. Past, Present, Reasonably Foreseeable Future Actions Summary

Action Type	Past	Present	Reasonably Foreseeable
Livestock Grazing/Term Permit Renewals (TPRs)	x	x	x
Livestock range improvement installation/modification/removal	x	x	x
Lands Actions (see Table 4)	x	x	x
Recreation	x	x	x
Minerals Actions (see Table 4)	x	x	x
Fuels treatments/Habitat restoration projects (e.g. mowing, seeding)	x	x	x
Wild Horse management	x	x	x
Wildfire and suppression activities	x	x	x
Post-wildfire Emergency Stabilization and Rehabilitation (ESR)	x	x	x
Travel Management			x
Collection or harvest of Forestry products (e.g. pinenuts, firewood)	x	x	x
Invasive and noxious weed treatments	x	x	x
Lahontan cutthroat trout reintroductions	x	x	x

Management actions and activities within the EDO have influenced aquatic species and riparian habitats in the past and have the potential to continue to impact them in the future, including Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*) (LCT), a federally Threatened species in the EDO. The 1995 LCT Recovery Plan identified potential LCT reintroduction streams (Coffin and Cowan 1995) and depending on recovery opportunities, LCT reintroductions can occur in streams not listed in the Recovery Plan. Stream conditions and habitat must meet standards to support trout population before reintroductions can occur. Several successful reintroductions have occurred and it is reasonably foreseeable that reintroductions of LCT will continue into appropriate habitat within the EDO (Map 11, Appendix A). For more discussion regarding fish species, see Section 3.2.10.

Wildfire within the EDO has been the major factor affecting vegetation communities in recent decades. Since 1992, a cumulative total of 4.81 million acres have burned, creating a fire-affected footprint of 3.47 million acres, or 28% of the area within the EDO boundary (owing to the fact that a portion of the burned area has burned multiple times). In 2017, over 538,000 acres burned within the EDO. With the introduction and spread of invasive annual grasses and relatively successful fire suppression over the past century, the historic fire regime has been altered to favor larger, more frequent wildfires with concomitant conversion of some vulnerable shrub-steppe vegetation communities to an annual grassland-dominated state. The severity of the alteration of the historic fire regime is expected to intensify as invasive species continue to increase in distribution. For more discussion regarding wildfire, see Section 3.2.7.

Livestock grazing within the EDO existed historically and continues under the multiple use mandate of public lands managed by BLM. The EDO administers livestock grazing on 239 allotments that span a total of 9,806,762 acres, using 91 permits that annually allocate up to 469,148 AUMs (including 98,079 suspended AUMs). Many of these allotments are further divided into pastures to facilitate livestock grazing management practices. Livestock grazing in these allotments has either been addressed, is being addressed, or is scheduled to be addressed through the Term Permit Renewal process.

Permitted livestock grazing is authorized under 10-year term grazing permits. When permits are renewed based on the Standards and Guidelines determinations and subsequent NEPA process (fully processed), changes in permit terms and conditions (e.g. livestock numbers, season of use, AUMs) are made where allotments are not meeting standards and livestock are a significant causal factor. Since 2007, 32 allotments in the EDO have had associated permits that have been fully processed. Where permits have been processed, livestock grazing management has generally improved, and many degraded vegetation communities have either stabilized or are improving. For more discussion regarding livestock grazing, see Section 3.2.6.

Noxious and Non-native, Invasive Weed Management is accomplished via Integrated Weed Management (IWM) techniques, which consist of prevention and education, inventory, treatment, and monitoring. Treatment options include: manual/mechanical, chemical, biological, and cultural.

Over 48,000 acres of EDO lands are infested with invasive and noxious weeds as indicated in the National Invasive Species Information Management System database (does not include a complete record of historic data or ESR data). Past annual efforts include: 500,000 to 1,000,000 acres inventoried, 2,000 to 4,000 acres treated (primarily broadleaf herbaceous species), and 700 to 4,000 acres monitored; partnerships and collaboration with CDs, CWMAs, etc. is an ongoing process. Similar inventory, treatment, monitoring, collaboration, and education/outreach efforts are expected into the future as available funding and resources allow. For more discussion regarding weeds, see Section 3.2.9.

Wild horse past actions include establishment of HMAs, establishment of appropriate management levels (AML) and wild horse gathers. Today the HMAs in EDO have a combined estimated population of 5,482 wild horses. Current BLM policy is to conduct removals targeting portions of the wild horse population based upon age, and allowing the correction of any sex ratio problems that may occur. Further, the BLM's policy is to conduct gathers in order to facilitate a four-year gather cycle and to reduce population growth rates where possible; it is reasonably foreseeable that gathers would continue to be a part of the management of wild horses.

Travel management is a systematic review of travel routes based on established evaluation criteria. By the end of the process, routes are inventoried and classified by type, have acceptable modes of transport identified, route objectives established, and an OHV use designation made for orderly management.

PPRFFAs for Lands and Minerals within the CESA are summarized below in Table 4. In this case, Past is defined as actions that are closed, Present is defined by authorized and expired actions, and Reasonably Foreseeable is defined as pending actions. These figures are compiled from LR2000 reports within the EDO boundary as of 11/30/2017.

Table 4. Lands and Minerals PPRFFAs

Action Type	Past	Present	Reasonably Foreseeable
Lands Actions (Number of Actions)			
Rights-of-Ways	491	1,001	48
Leases/Permits	129	20	15
Disposals/Transfers	1,120	261	38

Action Type	Past	Present	Reasonably Foreseeable
Lands Actions (Acres)			
Rights-of-Ways	200,333	65,820	18,416
Leases/Permits	14,439	2,853	784
Disposals/Transfers	1,023,209	687,841	2,854,099
Minerals Actions (Number of Actions)			
Oil and Gas Leases	5,180	202	5
Plans	52	49	5
Notices	1,318	81	7
Solid Leasables	5	0	1
Geothermal	146	34	8
Mineral Materials	162	59	7
Minerals Actions (Acres)			
Oil and Gas Leases	15,375,013	840,478	2,986
Plans	4285	45,166	149.66
Notices	2,239	163	8.7
Solid Leasables	8,400	0	2,560
Geothermal	297,935	41,905	28,027
Mineral Materials	3,594	1,587	47

3.2. Affected Environment and Analysis of Environmental Effects

3.2.1. Socio-Economics

3.2.1.1. Affected Environment

A 2017 report from Nevada Department of Agriculture found that the livestock industry is an important economic activity in Nevada. Nevada's total value of the agriculture sector output was $4.6 billion. The largest agriculture production industry output value was the beef cattle ranching and farming sector at $377 million. Beef cattle were also the top foreign export for Nevada in 2015 at $258 million (out of 3.9 billion total). Eighty-three percent of Nevada's agriculture operations are those primarily engaged in raising livestock; beef was the largest food exporting commodity in dollar value in 2015 for the state. In 2014, Nevada had an estimated 575,000 cattle and calves in inventory (NDA 2015, NDA 2016, NDA 2017, USDA 2016).

A 2015 report from Nevada Department of Agriculture revealed that livestock operations are also a substantial part of the economy in Elko County. Beef cattle ranching and farming was the largest in production output for agriculture at $95.4 million out of a total of $134 million in 2015. The agriculture sector employment accounted for 3.5% of the total county's employment in 2015; this sector equates to $31.3 million in Elko County labor income value with 879 employees. The ratio of total direct impact to impact value yields a multiplier of 1.4, meaning that every dollar invested in Elko County's agriculture sector industries stimulates another $0.40 in additional economic activity in other industries in the state.

The employment multiplier was 1.3, meaning that every 10 jobs directly related to agriculture support an additional 3 jobs in the state. (NDA 2015, NDA 2016)

EDO has a land base of just under thirteen million acres, of which 71.5% is in Federal ownership. Hay is the principle crop raised on the private farmlands. The 2012 Census of Agriculture counted 552 farms and ranches in Elko County. Approximately 68% of all Elko County beef cattle operations held federal grazing permits. The average Elko County ranch derives 49% of its annual forage requirements from public lands. Each AUM utilized on public lands in Elko County is estimated to have a total annual production value of $38 and a total annual economic impact of $68 when considered independently of private land resources; when combined with private lands involved in livestock operations, these figures increase to an annual production value of $84 per AUM and a total economic impact of $148 per AUM. (Alevy et. al. 2007; Fadali et. al. 2009; Fadali and Harris 2006; Harris et. al., 2007; USDA 2012).

The current grazing permits are varied for the EDO. Livestock grazing permits differ by allotment for season use dates and AUM capacity. EDO authorizes a total of 371,069 AUMs for 91 operators/permittees over 239 allotments (96 in Wells FO and 143 in Tuscarora FO). This represents a total annual economic impact of $25,232,692[1] to the Elko County economy for the public AUMs alone and $54,918,212[2] for public and private. The additional economic income to the county associated with the livestock industry includes fuel costs, feed, supplements, land improvements (fencing, troughs, etc.), and other animal husbandry expenditures (USDI 2017).

Despite the economic importance of the farming and ranching industry to the local economies, the business of livestock grazing remains challenging. Rates of economic return on investment are low, usually averaging about two percent. Volatile cattle and energy input prices and ever increasing equipment capital costs hamper the viability of livestock operations. Increased mining activity driven by high mineral prices and expanding use of public and private lands for recreation also causes conflicts with the livestock industry. Trends in livestock operation demographics in Elko County show a general increase in the number of individual ranch operations, a decrease in the physical size of individual operations, and a gradual aging of the ranching population. These trends reflect the on-going break up of large commercial cattle operations into smaller hobby and/or lifestyle ranches and the lack of recruitment into the industry as children of operators leave the ranch for better opportunities elsewhere(Tanaka et al. 2005).

The role of western rangelands in the livestock industry had been declining in recent decades, largely through the abundant availability of cheap grains fueled by cheap oil. However, the increased demand for grains (principally corn) for competing uses, especially energy production, has reversed these trends in the past several years. Range grazing of livestock is "proven to be the most environmentally benign and energy efficient of all land-based food production systems" and involves 30-80% less energy input than present production systems (Holechek 2011). Predictions are that future energy shortages may re-emphasize and promote the role of western rangelands, both private and public, to meet American food needs. The trailing of livestock facilitates the ability to reach western rangelands to graze public lands and carry on the industry.

[1] Calculated using the total annual economic impact value of a public AUM ($68) multiplied by the total EDO AUMs (371,069).
[2] Calculated using the total annual economic impact value of public AUMs and private lands involved with livestock operations ($148) multiplied by the total EDO AUMs (371,069).

3.2.1.2. Environmental Effects

Alternative 1- No Crossing Permits Authorized

Effects of this alternative would be both short- and long-term and affect the economic viability of permittees in the EDO. Livestock operators could potentially travel several additional miles to reach their destinations; this action could cause weight loss in livestock, additional days spent trailing, and added costs of hiring help. Permittees could face higher operating costs due to the increased expenses of trucking animals. This equipment, specially designed and modified to haul livestock is costly, and some of it is not easily adapted to haul anything else but livestock (NDA 2016). Such increased costs may impact the economic viability of the ranch operation, and could cause the operation to go out of business.

Alternative 2- No Action

Under this alternative, no changes would be made to how livestock are currently trailed to their destination and would have minimal to no short-term effects to socioeconomics. However, Alternative 2 could have substantial long-term effects if impacts to resources are not recognized and rangeland health decreases; loss of forage may result in reductions of AUMs or season of use. Overall economic impacts to Elko County would be unchanged from the current situation described in the affected environment.

Alternative 3- Proposed Action

Overall effects of this alternative would be similar to Alternative 2 except that the impacts to resources would be better known, and reduced or prevented through the application of stipulations, reducing the potential for long-term effects. Short-term effects of cost increases would be balanced by long-term effects of improved rangeland health. Overall economic impacts to Elko County would be positively negligible to unchanged from the current situation described in the affected environment.

Cumulative Effects of the Alternatives

PPRFFAs having effects on socioeconomics include livestock grazing, wildland fire and recreation.

Alternative 1

Alternative 1 would have an additive negative effect on socioeconomics when combined with wildland fire, and a countervailing effect when combined with the economic benefits of livestock grazing and recreation. Cumulative effects of Alternative 1 would be minimally negative within socioeconomic fluctuations.

Alternative 2

Alternative 2 would have a minimally additive negative effect on socioeconomics when combined with wildland fire, and a countervailing effect when combined with the economic benefits of livestock grazing and recreation. Cumulative effects of Alternative 2 would be neutral to positive within socioeconomic fluctuations.

Alternative 3

Alternative 3 would have a minimally countervailing effect on socioeconomics when combined with wildland fire, and an additive effect when combined with the economic benefits of livestock grazing and recreation. Cumulative effects of Alternative 2 would be neutral to positive within socioeconomic fluctuations.

3.2.2. Cultural Resources

3.2.2.1. Affected Environment

Various cultural resource inventories have been completed and many historic properties recorded across the EDO. However, most of the public lands remain un-inventoried and only a fraction of the cultural resources recorded. Some of the known or expected cultural resources within the EDO have historical or architectural significance, but most of the resources are archaeological in nature and their primary significance is the potential to provide insight into history and prehistory. These archaeological resources often consist of artifact scatters marking the locations of former habitation sites, camps, resource processing, management or procurement locations, transportation features, refuse disposal areas, etc. Historic and prehistoric archaeological sites are commonly located near springs, seeps, and creeks; therefore, it is anticipated that cultural resources will be identified at water sources within the proposed project area.

Prehistoric sites (i.e., sites dating prior to Euro-American contact) commonly include artifacts such as projectile points (e.g. spear points and arrow points), scraping and cutting tools, ceramics, grinding stones, cooking stones, hammer stones, and flaking debris from tool manufacture. Food debris (e.g. bone, burned seeds, mussel shell) and features (e.g. cooking hearths, house floors, and storage pits) may also be present, but usually are not visible on the surface. Historic sites commonly contain tin cans, glass, ceramics, metal and wooden objects, foundations, and other types of structures. There are also numerous historic roads and trails, such as the California Trail, Hasting's Cut-off, and the 1919-1930 Lincoln Highway.

Livestock use (including cattle, sheep, and domestic and wild horses) over the last 150 years has likely affected many cultural resources in the EDO to one degree or another. While we cannot specifically identify the types and extent of impacts to most cultural resources within the EDO, experimental research has demonstrated that livestock trampling can damage, break, and dislocate artifacts (U.S Army 1990; Roney 1977). Common livestock damage observed at archaeological sites includes trampling, trail formation, wallowing, bedding, soil compaction, vegetation removal, rubbing on structural remains (e.g. using a cabin wall as a scratching post), and bodily waste elimination. These actions can impact or obliterate archaeological stratigraphy, site patterning, features, cause or exacerbate erosion, break, displace, and mix artifacts, and contaminate sediments and archaeological organic residues with fecal material and urine (Ataman 1996, Broadhead 1999, U.S Army 1990). Past impacts by livestock within the EDO are likely to have ranged from minor movement of surface artifacts to severe damage to sites and artifacts. Some of the factors thought to play a part in current cultural resources condition and sensitivity to livestock impacts include soil type, soil moisture, terrain, season of use, grazing history, vegetation cover, and intensity of use.

3.2.2.2. Environmental Effects

Alternative 1- No Crossing Permits Authorized

Alternative 1 proposes to deny trailing cross-country across public lands. Denying trailing across public lands would limit additional short- and long- term effects to cultural resources by livestock. Not permitting trailing on public lands limits congregation areas to those already allowed under existing grazing permits. Additionally, indirect effects could include visual and audible impacts from increased traffic, construction activities, increased visitation to archaeological sites, vibrational disturbances, and increased risks of erosion.

Alternative 2- No Action

The No Action alternative would have short- and long-term effects on cultural resources. By not properly managing trailing activities, it is impossible to know what trailing corridors and congregation areas are being used; thus, making it impossible to minimize or eliminate effects to historic properties from those activities. Congregation areas have the potential for redistribution of artifacts, eliminating the potential for spatial analysis at those sites. Trampling could also result in the breaking of artifacts and increasing the potential for erosion leading to damage or destruction of historic properties. Further, the No Action alternative would allow trailing on historic roads and trails, potentially compromising the integrity of these resources. Concentrated trailing on a historic trail, such as the California Trail, could lead to increased trampling and erosion that has the potential to destroy portions of the trail. The No Action alternative could result in adverse effects to historic properties.

Alternative 3- Proposed Action

The Proposed Action is to allow cross-country trailing by permittees for up to 10 years. This alternative does have the potential to have short- and long- term effects on cultural resources. Dispersed trailing of livestock would likely have a minimal impact on cultural resources; however, the displacement and breaking of artifacts due to dispersed trailing is possible. Impacts to cultural resources are more likely to occur in areas of concentrated use, such as bedding areas, trough locations, drop off and pick up locations, and concentrated trailing along features such as fences. Heavy use of an area by livestock, even in a short span of time, can cause serious damage to cultural resources and historic properties. Identifying trailing corridors and congregation areas, and using previously disturbed areas for bedding, troughs, and camps would reduce effects to cultural resources.

Under the Proposed Action, stipulations would require that each permit application include specific locational information for trailing corridors and congregation areas. Each permit application would be subject to Title 54 U.S.C. §300101, et. seq., commonly known as the National Historic Preservation Act of 1966, as amended (NHPA), and Title 54 U.S.C. §306108, commonly known as Section 106 of the NHPA (Section 106) prior to approval. Total avoidance of historic properties and limitations for congregation areas around National Historic Trails and water sources would help to minimize impacts to cultural resources under the Proposed Action.

Cumulative Effects of the Alternatives

The PPRFFAs having effects on cultural resources are livestock grazing/term permit renewals, livestock range improvement installation/modification/removal, lands actions, recreation, minerals actions, fuels treatments/habitat restoration projects, wild horse management, wildfire and suppression activities, post-wildfire emergency stabilization and rehabilitation, travel management, collection or harvest of Forestry products, and invasive and noxious weed treatments.

Alternative 1

Alternative 1 would have a negligible countervailing r cumulative effect to cultural resources when combined with the PPRFFAs. Despite denying trailing on the public lands, cultural resources would continue to be impacted by the above listed PPRFFAs. Surface disturbance related to the above actions could result in the displacement and/or physical damage or destruction of artifacts and other types of cultural resources, such as structures and features. It is important to note that the above listed PPRFFAs are subject to the Section 106 process before the undertaking is approved; this helps to mitigate any direct or indirect project effects to historic properties.

Alternative 2

Alternative 2 would have an additive negative cumulative effect to cultural resources when combined with the PPRFFAs. Under Alternative 2 the BLM would not make any modifications and/or reductions to applications related to resource-specific terms and conditions; these impacts, as discussed above, and the PPRFFAs listed above have the potential for additional direct and indirect adverse effects over time even when in compliance for Section 106. The affects to historic properties could range from loss of integrity to total destruction.

Alternative 3

The Proposed Action has would have a minor countervailing cumulative effect to cultural resources when combined with the PPRFFAs. Limiting the Proposed Action to existing disturbances when possible or by total avoidance of historic properties reduces or eliminates additional adverse effects and counteracts effects from the PPRFFAs. The resulting cumulative effect would be better preservation of historic properties.

3.2.3. Soils

3.2.3.1. Affected Environment

The territory of the EDO falls within four major land resource areas (MLRAs). See Map 2 for boundaries and Table 5 for descriptions. The majority of the district lies within the Owyhee High Plateau MLRA, while the southeastern portion of the district is within the Central Nevada Basin & Range MLRA. The eastern margin of the district is within the Great Salt Lake Area MLRA and a small portion of southwest of the district is within the Humboldt Area MLRA.

The extremes of climate, relief, aspect and geologic type combine to form a wide variety of soil types. Soils vary with differing parent materials, position on the landscape (landform), elevation, slope, aspect and vegetation. Soils range from those on the valley floors that are frequently deep, poorly drained and

alkaline with a high salt content to shallow mountain soils formed over bedrock with pH levels near neutral. Most of the soils within the EDO are aridisols, mollisols, and entisols.

The soils in the valleys are mainly mineral soils of two types: those that do not have water continuously available for three months when the soil is warm enough for plant growth (aridisols); and soils showing little evidence of the soil forming process, the development of horizons or layers (entisols). Aridisols dominate deserts and xeric shrub lands and have a very low concentration of organic matter. Water deficiency is the major defining characteristic of aridisols. Entisols accumulate on land surfaces that are very young (alluvium, mudflows), extremely hard rocks or disturbed material, mined land, highly compacted soils, or toxic material.

The mountains within the EDO consist of aridisols and entisols, and some deeper mineral soils with grass cover and a brown surface horizon (mollisols). Generally, entisols occur on steep mountain slopes where erosion is active. They also occur on flood plains and alluvial fans where new material is deposited. Aridisols and mollisols are older and occur on more stable alluvial fans and terraces.

Average annual soil loss varies across the EDO. Some soils exhibit high erosion rates while others are expected to exhibit much lower erosion rates. In general, as disturbance increases and/or soil cover is reduced, soil loss increases compared to what would be expected on the site. Management actions which maintain or improve vegetation cover and reduce disturbance are expected to reduce the rate of wind and water erosion.

Biological Soil Crusts

Biological soil crusts can be an important component of many ecological sites in EDO. They function as living mulch by retaining soil moisture and discouraging annual weed growth. They reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (Eldridge and Greene 1994, Belnap and Gillette 1997, 1998, McKenna-Neumann et al.1996). Biological soil crusts also protect interspatial surface areas from various forms of erosion. By occupying this area between larger plants, these crusts enhance soil stability, soil moisture retention, and site fertility (by fixing atmospheric nitrogen and contributing organic matter).

In the NRCS "National Range and Pasture Book", biological soil crusts are identified as a critical ecological attribute to be used as an indicator of rangeland health (USDA-NRCS 2003). These crusts may serve as an early indicator of ecological site decline since they appear to be more sensitive to disturbance than vascular plants. In addition, the crusts also appear to limit germination and establishment of invasive annual grasses (USDI 2001). Biological crust condition and spatial extent is a direct function of the ecological health of the plant community. Within EDO crusts will be less likely to occur in sites that have experienced successive disturbance legacies (e.g. seedings, agricultural sites, and roadsides). In general, the presence of well-developed biological soil crusts in sandy soils is an uncommon occurrence because these types of soils are more prone to disturbance. Biological soil crusts are also more prevalent at lower elevations compared to higher elevations with greater precipitation where vascular plant growth precludes biological crust development (USDI 2001).

3.2.3.2. Environmental Effects

Impacts to soils by livestock trailing depends on trailing frequency, location, and timing, type and number of livestock, rate of livestock movement, location of concentrated use areas (e.g. bedding), land slope and aspect, vegetation, climatic conditions during and after trailing, and soil type, texture, and erosion susceptibility. For example, trailing on steep south-facing slopes, combined with erosion prone soils and sparse or shallow-rooted vegetation, would be more likely to impact soils.

Impacts to soils from livestock trailing include a loss of ground cover (such as biological soil crusts, litter, and vegetation) from grazing and trampling, and soil compaction and pedestals in areas where livestock trailing occurs, especially where ground cover has been reduced or removed. Soil disturbance reduces surface soil resiliency to wind and water erosion especially in shallow-rooted annual-dominated plant communities. Soil compaction reduces water infiltration and increases surface runoff. Soil surface disturbance affects biological crusts specifically because greater than 75% of photosynthetic biomass and productivity is from organisms living in the top 3 mm of soils (Belnap et al. 2003). Disturbance that results in even small soil losses can dramatically reduce site fertility and further reduce soil surface stability (Garcia-Pichel and Belnap 1996). Loss of ground cover can result in decreased plant carbon and nitrogen fixation, and decreased availability and spatial distribution of nutrients (Harper and Belnap 2001) in addition to increased evaporation, reduced infiltration, and increased soil erosion.

Disturbance timing can affect the degree to which the cover and species richness of a biological crust is reduced. Soils have different intrinsic soil strengths that vary with moisture content. Soils with little tendency to form aggregates, such as sands, are more susceptible to mechanical damage compression stresses when dry. Crust components are brittle when dry, and the connections they make between soil particles are easily crushed. Thus, compressional disturbances can severely affect the crust's ability to stabilize soils, especially in dry sandy and silty soils (Belnap et al. 2001). As crustal species are only metabolically active when wet and are brittle when dry, disturbance in dry seasons is generally more destructive, and organisms are less able to recover, than when disturbed in wet seasons (Harper and Marble 1988; Marble and Harper 1989). Fine-textured soils or those with inorganic crusts are more vulnerable to compressional disturbance when wet (Webb and Wilshire 1983). On loamy soils of the Great Basin, early wet season (winter) use by livestock has been shown to have less impact on crust cover and species composition than late winter or spring use (Belknap et al. 2001). Crusts on clay soils can be an exception, as they are often more vulnerable when soils are wet.

Alternative 1- No Crossing Permits Authorized

Annual fluctuations in vegetation and litter cover would affect expected rates of soil movement in areas where trailing is no longer occurring. Minor to moderate levels of soil displacement would continue to occur within highly erodible sites as a function of vehicle use and natural erosional processes. Major effects (e.g., sheet erosion in areas with sparse cover, rill and gully formation where overland water flows concentrate) could occur in localized areas depending on weather events (e.g. high-intensity winds, severe thunderstorms, or rain on snow events). No additional short-term impacts, outside intermittent soil displacement and redistribution by livestock associated with current grazing permits would occur on cross-country routes. Impacts to soils would still occur from livestock trailed during authorized use

periods, without a crossing permit, between pastures within an allotment or between adjacent allotments for which a permittee has authorized use.

Indirect, long term impacts would consist of moderate to major vegetative recovery (depending on level of disturbance and climatic conditions) of bedding areas, within livestock trailing buffers along unimproved roads, and along cross-country segments. Increased vegetation cover would reduce soil movement and allow recovery of biological soil crust components over time. Recovery would allow for decreases in soil compaction, increases in water infiltration, decreases in surface runoff, increased soil roughness that affects soil texture, micro-topography, and soil temperature. Additionally, plant carbon and nitrogen fixation for biological crusts would increase along with the availability of magnesium, potassium, iron, calcium, phosphorus manganese, and sulfur (Harper and Belnap 2001) for biological crusts, and the spatial distribution of nutrients would improve.

Alternative 2- No Action

Impacts noted in the previous section could potentially occur unchecked as the EDO would not have the ability to modify permit terms and conditions in a timely manner to address soil resource concerns.

Alternative 3- Proposed Action

Livestock trailing management practices that minimize surface disturbance, especially in areas with biological soil crusts, would decrease soil erosion potential by increasing greater soil aggregate stability (Thurow 1991), increasing water infiltration, and helping to retain organic matter. Stipulations provided in the Proposed Action would limit impacts to soil resources.

Cumulative Effects of the Alternatives

The PPRFFAs having effects on soils are livestock grazing, wildland fire, ESR, fuel breaks/ habitat restoration (drill seeding) and motorized recreation.

Permitted livestock grazing will likely result in localized areas of soil surface degradation and plant community alterations that result in adverse impacts to soils in localized areas adjacent to gates, watering areas, and dietary supplement areas, and would be incrementally additive to the impacts of trailing. Most overnight areas would occur in already disturbed areas such as along roads, around troughs, or near other range improvements where soil compaction has already occurred due to maintenance, construction work, or permitted grazing. Appropriate grazing management combined with annual monitoring practices will prevent soil degradation and impacts to biological soil crusts on a landscape level.

Wildland Fire and ESR activities may occur within the allotments encompassing potential trailing routes. Fire suppression activities would vary at both temporal and spatial scales depending on yearly fire severity and extent. Suppression related disturbances such as dozer-use along linear features are seeded post-fire which would reduce longer-term soil displacement. Depending on type of drill equipment (e.g. rangeland and minimum till drills used in association with ESR and restoration projects), short-term increases in soil displacement would occur during seeding operations associated with ESR and habitat improvement projects. The primary purpose of ESR plans is to stabilize soils from erosion impacts by assuring that the pre-existing native plants and proposed seeded plants are protected and allowed to

recover. These activities could include the installation of temporary fences, cattle guards, drill seeding and shrub plantings that would disturb soils. These areas would not be impacted by trailing activities as they are rested until stabilized.

Fuel Breaks use of mowing and drill seeding equipment could impact soils. Mowing equipment could create localized and short-term disturbance to soil surfaces and biological crusts. The disturbance would be confined to the structural breakdown, from tires, of soil aggregates and biological soil crusts. Mowing would cut but not remove vegetation; therefore, erosion would not be expected to increase. Drill seeding equipment would moderately disturb soils approximately 2 to 4 inches deep and 2 to 4 inches wide every 12 inches.

Motorized recreation will disturb soils and soil crusts; however, traffic is generally confined to existing routes. ROW maintenance involves periodic removal of vegetation in localized areas. The overall effect to soils is slight due to the small amount of area affected. Noxious weed treatments in the project area are expected to reduce long-term soil loss from erosion by preventing the loss of native habitat.

Alternatives 1 and 3 are not expected to contribute to cumulative impacts to soil resources, when added to the impacts of the PPRFFAs, because of the minimization or absence of direct and indirect effects. Similarly, Alternative 2 is not expected to substantively contribute to the cumulative impacts to soil resources when combined with the PPRFFAs because it is such a negligible component of the status quo.

3.2.4. Water Resources

3.2.4.1. Affected Environment

The EDO overlies five watersheds classified by the United States Geological Service (USGS) as sub-regions (Seaber, et al 1987). These include the Middle Snake, Upper Snake, Black Rock Desert-Humboldt, Central Nevada Desert Basins, and Great Salt Lake sub regions. The Nevada Division of Water Resources (NDWR) delineates watershed boundaries in a manner that differs from that of the USGS with watersheds referred to as hydrographic regions (NDWR 2017). In the EDO, the NDWR hydrographic regions follow approximately the same boundaries as the USGS sub-basins; however, the NDWR hydrographic regions are named differently, and the NDWR combines Middle and Upper Snake River sub-basins into one hydrographic region.

The BLM district boundaries do not correspond to the USGS sub-basin or watershed boundaries. Instead, the district boundaries intersect portions of watersheds characterized by internal surface drainage and ground water flows. The Black Rock Desert-Humboldt sub-region drains into the Humboldt River system, ending at the Humboldt Sink. The upper and lower Snake sub-regions flow primarily north into the Snake River, and eventually to the Pacific Ocean. The Central and Salt Lake sub-regions are comprised of many internal basins with individual “terminal” playas. Groundwater flow in these watersheds generally flows in the same direction as surface water; however, there is some flow between basins (Heilweil and Brooks, 2011).

The climate of the EDO is semi-arid and surface water is limited. Recorded precipitation 30 year (1981-2010) 12 month (January through December) averages within the EDO range between 8.28 and 35.41 inches per year (NRCS 2017). Precipitation is greater at higher elevations and most precipitation falls as snow during the winter months. About 10% of precipitation reaches streams or infiltrates into

groundwater and the rest is consumed by vegetation or evaporates (NDEP 2016). Winter precipitation concentrates in streams primarily in the spring as snow melts. The majority of streams within EDO are ephemeral and flow only in response to this snowmelt or heavy rainfall events. As categorized by the National Hydrologic Dataset (NHD), there are approximately 29,300 miles of ephemeral streams, 12,700 miles of intermittent streams, and 4,900 miles of perennial streams within the EDO boundary. Approximately 1000 of these perennial stream miles occur on BLM administered land (USGS 2017).

Some of precipitation that falls within the EDO infiltrates into the ground and resurfaces as springs. The NHD identifies around 6,500 springs within EDO of which approximately 2,600 occur on BLM administered land (USGS 2017). These springs exhibit the full range of water chemistry and other water quality characteristics as determined by their flow paths through local, intermediate, or regional aquifers (Sada, et al 2001). Springs on BLM administered lands may have substantial flows; however, most are small and discharge less than 0.5 gallons per minute.

Both natural characteristics and anthropogenic activities control the hydrology of the EDO. Low population and relative lack of development of the EDO area allow natural effects to be responsible for most of the hydrologic variability. These effects include flooding, drought, climate change, and wildfire. Anthropogenic effects result from land use such as livestock grazing, mining, and other beneficial uses. These activities can alter hydrologic characteristics of the landscape within EDO such as timing of peak flows and distribution of water resources.

Streams, springs, reservoirs and groundwater provide water for a variety of beneficial uses including irrigation, riparian vegetation, mining, municipal, domestic, livestock, recreation, and wildlife. A large portion of available water is used for irrigation and is diverted directly from streams or through groundwater wells. Within the EDO most irrigation occurs on private land, but some irrigation does occur on public land adjacent to Mary's River. Another large portion of water is consumed directly from surface and shallow groundwater by riparian vegetation. The riparian vegetation adjacent to streams, springs, and other waterbodies relies on the dependable water that these sources provide. Municipalities and domestic water users divert water primarily from groundwater wells on private land however there are a few of these types of diversions from springs on BLM and private land. Mining operations divert water for mining and milling as well as dewatering on private and BLM land. Livestock and wildlife drink directly from diverted and un-diverted springs and streams that exist on both BLM and private land.

As required by the Clean Water Act, the Nevada Department of Environmental Protection (NDEP) assesses the water quality of surface waters in relation to criteria established for specific beneficial uses as defined in Chapter 445A (Water Controls) of the Nevada Administrative Code (NAC). Water quality standards as contained in the NAC 445A define water quality goals for waterbodies within the EDO. The standards, based on the beneficial uses for these waterbodies, contain both narrative and numeric criteria. Narrative standards contained in NAC 445A.121 apply to all surface waters of the state including streams and springs and require waters to be "free from" various pollutants. Numeric standards found in NAC 445A designate specific criteria so that water is suitable for beneficial use (NDEP 2016).

There are approximately 760 miles of streams on BLM administered land within the EDO for which the Nevada Division of Environmental Protection (NDEP) has identified beneficial uses and numeric water quality standards. Approximately 400 miles of these streams have been identified as having water quality

that does not fully support their beneficial uses. These are included in Nevada's 303(d) list of impaired waters. Inclusion of streams on this list is most commonly due to exceedances of parameters set to support aquatic life such as the temperature and total phosphorus criteria (NDEP 2016). The NDEP report did not identify any waters in exceedance of narrative standards.

The NDEP has stated that some numeric water quality standards set for Nevada streams may not be appropriate, or even achievable. Although water quality standards are a good starting point, it is not known whether beneficial uses are truly supported until a total maximum daily load (TMDL) is developed for a waterbody. A TMDL is an assessment of the amount of pollutant a water body can receive and not violate water quality standards. Total phosphorus and temperature exceedances do not necessarily mean that beneficial uses are not being supported since elevated values may not necessarily be causing the associated undesirable conditions such as algal growth or low dissolved oxygen (NDEP 2009). The TMDL prepared for Hanks Creek and Dixie Creek in EDO illustrates how better standards can be applied for streams on BLM administered land by choosing criteria that are achievable and appropriate for existing beneficial uses (Pahl 2010).

Water quality in EDO waterbodies is the result of a wide variety of natural and human caused characteristics, occurrences and activities. Geology, topography, climate, vegetative cover, wildfire and land use are all factors in determining the chemical, physical, and biological properties of these natural waters. Some surface waters may have naturally high levels of various dissolved solids, nutrients, or high temperature while others express these attributes as a result of a combination of natural conditions and anthropogenic influence (Hem 1970).

Land use may have considerable direct and indirect impacts on water quality. Some land uses, such as mining and sewage treatment facilities, may discharge contaminated water directly into waterbodies and are known as point sources. Most sources of anthropogenic water quality degradation in the EDO however are the result of diffuse inputs throughout the watershed known as non-point sources. Livestock grazing is the most common and widespread land use on BLM managed lands within the EDO, and is likely the most substantial non-point source impact. Wildlife use causes similar, but less intense, impacts to water quality.

3.2.4.2. Environmental Effects

Most livestock impacts to water quality are indirect and result from alterations to the physical characteristics of streams and watersheds. Livestock grazing on uplands can lead to increased erosion and soil transport to streams, which can result in a long term increase in stream nutrients in addition to dissolved and suspended solids. Increased sediment supply often leads to deposition in streams and alteration of stream morphology. Similar impacts also occur as a result of utilization of riparian areas. Riparian area utilization can also decrease stream bank stability and floodplain function leaving streams more susceptible to changes in channel shape and function. Examples of negative impacts include incision, increasing width/depth ratio, decrease in sinuosity, increase in stream gradient, and riparian shading. These impacts negatively affect water quality by increasing intensity of flood flow; decreasing alluvial buffering, storage capacity, and base discharge; increasing stream temperature; and increasing the likelihood of elevated nutrient levels (Belsky et al, 1999).

Direct impacts to water quality from livestock grazing occur through physical disturbance and direct contact with water resulting in bacterial, nutrient, and sediment loading. Impacts are most noticeable when livestock are concentrated in and near water bodies. Following contact, water quality returns to background conditions as stream substrate and organisms remove or filter contamination (Belsky et al, 1999).

Alternative 1- No Crossing Permits Authorized

As livestock trailing across a stream is a small part of an aggregation of activities that contribute toward the impairment of water resources, no trailing would not likely promote any measurable improvement in water quality in the future, but also not be likely to further degrade. Alternative 1 would have no tangible direct or indirect effects on water resources.

Alternative 2- No Action

Impacts noted in the previous section could potentially occur unchecked as the EDO would not have the ability to modify permit terms and conditions in a timely manner to address water resource concerns.

Alternative 3- Proposed Action

Stipulations provided in the Proposed Action would limit direct and indirect effects to water resources resulting in effects comparable to Alternative 1 where water quality would not necessarily improve but would not be likely to further degrade.

Cumulative Effects of the Alternatives

The PPRFFAs having effects on soils are livestock grazing, wildland fire, ESR and travel management (road use/maintenance).

The primary activities that could cumulatively impact water quality at stream crossings, and in riparian areas near potential trailing routes, are trampling by cattle in existing permitted allotments and road use/maintenance, both of which result in a temporary increase in sediment contribution to streams. Additionally, defecation in and near riparian areas by the cattle using the allotments surrounding potential trailing routes would add upon defecation from cattle trailing across streams and on routes adjacent to riparian areas. The chance of a vehicle leak or spill occurring in such quantity that it would flow overland to a stream course is negligible.

Wildfire and ESR activities may occur within the allotments that surround stream crossings and riparian areas near potential trailing routes. Water quality could be impacted by a rise in turbidity and fine sediment levels due to runoff from burned areas, which would be additive if this occurred proximal to a trailing event. Alternatives 1 and 3 are not expected to contribute to cumulative impacts to water resources, when added to the impacts of the PPRFFAs, because of the minimization or absence of direct and indirect effects. Similarly, Alternative 2 is not expected to substantively add to the cumulative impacts to water resources when combined with the PPRFFAs because it is such a negligible component of the status quo.

3.2.5. Vegetation

3.2.5.1. Affected Environment

Trailing events in the EDO would fall within four MLRAs (Map 2). Each MLRA differs in topography, geology, hydrology, substrates, and levels of precipitation. The northern and central area consists mainly of the Owyhee High Plateau while the southeast corner comprises of Central Nevada Basin & Range. A small portion of the Great Salt Lake Area lies in the easternmost part of the EDO boundary. A minor component of the Humboldt Area MLRA lies in the southwest of the district.

Soil type (texture, chemistry, etc.), precipitation amount, elevation, past disturbance, and other site characteristics, both biotic and abiotic, dictate the type of vegetation which inhabits an area within an MLRA; see Table 5 below for descriptions. The EDO landscape is diverse, ranging from low to high elevation (approximately 3,000 to 11,900 feet), low to high precipitation (approximately 4 to 16 inches), and containing anywhere from shallow rocky soils to deep loamy soils. An array of vegetative communities supporting an array of native and introduced species comprises the EDO vegetative composition as a result of the factors listed above.

Table 5. Major Land Resource Area Descriptions

MLRA	General MLRA Description[1]	Soil Type	Cover Type/ Shrubs	Characteristic Herbaceous
24-Humboldt Area	Elevation from 3,950 to 8,850 North-south uplifted fault-block mountains separated by wide valleys filled with alluvium and lacustrine materials. Precipitation 4-16 inches Mainly snow in winter with some rainfall with high-intensity thunderstorms in spring and autumn with dry summers. Growing season averages 135 days and ranges from 100 to 175 days Average annual temperature of 38 to 53 degrees	Loams, Silts, Sandy Claypan, Floodplain, Bottom Saline Meadow, Saline Floodplain, Fans	Wyoming big sage, big sagebrush, shadscale saltbush, low sagebrush, Douglas' rabbitbrush, spiny hopsage snowberry bud sagebrush, black greasewood Nuttall saltbush Utah juniper	squirreltail, Thurber's needlegrass, Great Basin wildrye, Sandberg's bluegrass, Idaho fescue, Indian ricegrass, needle-and-thread, winterfat
25-Owyhee High Plateau	Elevation ranges from 3,000 to 9,840 feet Isolated fault-block mountain ranges separated by narrow desert plains Precipitation 7-16 inches Precipitation mainly winter snow; rainfall occurring in the spring and infrequently in the summer. Growing season averages 130 days; in high elevations it can be less than 70 days Average annual temperature of 35 to 53 degrees	Loams, Shallow Calcerous, Silty, Claypan, Gravely Clay, Mountain Ridge Flats, Saline Bottom	mountain snowberry, serviceberry, chokecherry, Basin big sage, curlleaf mountain mahogany, aspen, willow, Utah juniper, singleleaf pinion, limber pine	beardless wildrye, mat muhly, Idaho fescue, slender wheatgrass, Great Basin wildrye, carex, Sandburg's bluegrass, tufted hairgrass, lupine, Letterman's needlegrass, meadow barley, alpine timothy, mountain brome
28A-Great Salt Lake Area	Elevation 3,950 to 11,150 feet Poorly defined (low precipitation) mountains of marine sediment with steep side slopes separated by valleys consisting of closed sinks or playa lakes. Precipitation 5-12 inches	Silts, calcareous, loam, floodplain, saline	black sagebrush, cliffrose, antelope bitterbrush, shadscale, spiny hopsage,	bluebunch wheatgrass, Indian ricegrass, galleta, blue gramma, threeawn,

MLRA	General MLRA Description[1]	Soil Type	Cover Type/ Shrubs	Characteristic Herbaceous
	Precipitation is typically winter snow. High-intensity thunderstorms cause sporadic rainfall in the summer months. The growing season or freeze-free period averages 165 days Average annual temperature is 39 to 53 degrees	Clay, claypan, fan Alpine meadow, wet sodic bottom, wet meadow		Sandberg's bluegrass
28B-Central Nevada Basin and Range	Elevation 4,900 to 11,900 feet Desert basins and valleys bordered by sloping alluvial fans lay between steep mountain ranges trending north to south. Precipitation 4-12 inches Precipitation occurs in winter as snow or as rainfall in summer thunderstorms. The average annual temperature is 34 to 52 degrees F with a growing season of 125 days on average	loam, saline, floodplain, sodic, silty, calcareous, Clay, fan, claypan Meadow, streambank, wetland, alkali flat	shadscale, saltbush, black sagebrush, spiny hopsage, winterfat, Utah juniper, Douglas' rabbitbrush, ephedra, singleleaf pinion, mountain sage, Wyoming sagebrush	Indian ricegrass, needle-and-thread, galleta, sand dropseed, threeawn, squirreltail

(Stringham 2015, Stringham 2015, Stringham 2017)

3.2.5.2. Environmental Effects

The following general discussion of trailing-related effects is common to all alternatives.

Impacts to all vegetation include breakage (injury, deformity) via direct methods such as trampling and removal via grazing. Indirect effects comprise of potential degradation of vegetative communities associated with trailing and bedding activities such as potential spread of weedy species by livestock movement or transport methods. Trailing-related impacts associated with noxious weeds and invasive species are discussed in Section 3.2.9.

Effects of Trailing

Trampling would occur as livestock move through the landscape and in areas of congregation (e.g. watering and bedding locations). Trampling of perennial herbaceous plants is unlikely to cause mortality in established plants. This assemblage has a higher resilience to trampling than other vegetation due to extensive root systems and flexible tissues. Trampling of perennial vegetation would produce less of an impact during dormancy than during growth because perennial plants are less susceptible to above-ground injury when dormant. Trampling could uproot perennial plant seedlings and young plants, resulting in mortality to those plants. A simulated study of hoof action on total shoot biomass and detached material in short grass sod vegetation types suggests moderate levels of trampling (i.e., 4 footfalls) removes approximately 5% of living biomass (Abdel-Magid et al. 1987). It could also temporarily reduce productivity. Soil compaction (as described in Section 3.2.3) from trampling can affect vegetation by reducing water and oxygen infiltration and restricting root growth.

Trampling of annual plants could result in injury or mortality due to the fragility of the tissues. Seed banks could see reductions if trampled during their growing season and before seed set. Such seedbank reductions would be short term and negligible to minor due to abbreviated life cycles and generally high fecundity of annuals. Damage to plants and soils can reduce plants' overall competitiveness and could create niches for invasive plants to occupy, particularly where cheatgrass is a component.

Trampling of immature shrubs or trees could kill individuals by uprooting (Owens and Norton 1990). Mature shrubs or trees could be impacted by breaking of limbs or leaders. Certain shrubs (i.e. bitterbrush and shadscale) are more susceptible to trampling due to stiff tissues. Woody vegetation placed directly in the trailing corridors and bedding areas would commonly display more breakage and increased older age classes than vegetation found outside of the trails.

Livestock would graze preferentially on herbaceous components of the plant community in bedding areas and on the trail. Perennial grasses are most susceptible to grazing impacts during their critical growth periods (i.e. from seed stalk emergence to seed dissemination). Generally, the vigor of perennial grasses can be sustained with repeated light utilization, while repeated moderate to heavy utilization reduces photosynthetic tissue and can diminish plant vigor. Utilization during periods when plants are withdrawing reserves from roots for growth, during re-growth, or during seed formation will impact herbaceous species greater than the same level of utilization when the plant is not actively growing or is dormant. The short-term nature of incidental grazing would make any impacts to herbaceous species negligible.

Grazing of annual plants would remove biomass and could kill plants. Similar to trampling, these impacts would be short-term due to the high fecundity and short life cycles of this group. Palatability and rapid growth of cheatgrass is typically earlier than the rapid growth phase for perennial native grasses. Therefore, grazing in these communities during the winter or early spring could result in some minor short-term indirect benefit for perennial native species by potentially relieving some of the grazing pressure on perennial native grasses.

Livestock will increasingly utilize woody species (e.g. bitterbrush, shadscale, and mountain mahogany) as browse as herbaceous vegetation goes dormant (Stuth and Winward 1977, Ganskopp et al. 1999, Ganskopp et al. 2004). Reductions in biomass of woody species would be increased once the preferred herbaceous vegetation is dormant. Incidental grazing during the trailing process would result in insignificant effects on woody species.

Livestock may transport weed seeds that adhere to their bodies or drop undigested weed seeds in their feces. Cheatgrass has been known to spread in this manner (Young and Longland 1996). Trailing could indirectly elevate competition for limited resources between existing native and imported exotic species if livestock import and deposit exotic plant materials (Laycock and Conrad 1981). Openings in vegetative cover created by trampling could occur and provide opportunities for germination and spread of exotic annual plants, particularly where these species are adjacent to or components of the plant community. Livestock trailing could also have indirect short-term benefits for upland vegetation by dispersing native seeds and creating microhabitats for native species through localized soil disturbance (Burkhardt 1996).

The degree that plant communities would be directly affected increases as intensity increases. Greater numbers of livestock would increase the potential to trample or ingest vegetation compared to lower numbers of livestock. Timing of trailing affects the magnitude of impacts to vegetation. Trailing when plants are initiating growth or actively growing (typically in spring) would impact them more than trailing when they are dormant (perennials) or have completed their life cycle (annuals). Route characteristics (i.e.

previous disturbance) are also important influences on the magnitude of impacts. Trailing along existing roads would produce fewer impacts to vegetation than cross country trailing. How these three factors are combined would dictate the overall magnitude of impacts to upland vegetation.

The intensity of use also determines the amount of indirect impacts to plant communities. Low to moderate numbers of livestock would not damage or remove enough vegetation to allow for noxious or invasive plants to colonize a site. Large to substantial livestock numbers would damage vegetation and create bare ground openings that allow weedy species to establish. Weedy species that become established as a result of livestock trailing could spread into adjacent plant communities resulting in increased competition for resources over the short-and long-term. However, plant communities at higher elevations and/or in higher precipitation zones (e.g. near 11,150 feet in the Great Salt Lake Area MLRA and 11,900 in the Central Nevada Basin and Range MLRA) tend to be more resilient to disturbance and, therefore, more resistant to invasion by weedy plants than those at lower elevations in lower precipitation zones (e.g. Owyhee High Plateau and Humboldt Area MLRAs).

Alternative 1- No Crossing Permits Authorized

Alternative 1 would have few short-term effects on vegetation. With the cessation of trailing across BLM lands by those other than the current authorized permittee, vegetation would receive slightly less grazing use, compaction, and trampling pressure. This may cause a corresponding slight increase in density of plants where trailing cross-country once occurred. Long-term effects of Alternative 1 could include more residual stands of plants along existing trails. This may have an effect of slightly higher fire occurrences with a higher fuel load.

Under Alternative 1, some allotments may be unusable due to lack of access to operators. This would result in a moderate reduction in grazing pressure and could affect vegetation in many ways. One such effect is a possible increase in wildland fires in years with optimum plant growth; residual fuels left by a lack of grazing could cause additional fuel loading. In locations where cheatgrass is dominant, the lack of livestock grazing may result in increases in density as grazing is often the only use on this plant.

Alternative 2- No Action

Alternative 2 could have some short- and long-term effects on vegetation. Under this alternative, trailing events do not have a defined route or timeline. This could result in vegetation depletion, soil compaction, and plant trampling in areas if the livestock do not move through in a timely fashion. Long-term effects of this alternative are a possible downgrade in overall rangeland health. Alternative 2 would have an unknown amount of long-term affected vegetation, as current trailing procedures have no established routes and it is unknown what other disturbances are present.

Alternative 3- Proposed Action

Alternative 3 would have similar impacts to Alternative 2, but the imposition of stipulations will address the effects more effectively and allow for timely management adjustments to address problems. Under Alternative 3, BLM could authorize trailing routes which allow for monitoring for resource damage. Short-term impacts, such as livestock lingering in one area on the trail, could be immediately addressed and corrected the following year. There would be little to no potential for upland vegetation to be trampled or ingested by trailing livestock, as trail design would require constant movement of stock except for pre-approved bedding areas. Applications could be compared to existing trailing routes and other land-disturbing activities to determine whether they will require design features to avoid

degradation to flora. Water haul sites may be impacted by congregating livestock, but due to the temporary nature of the site(s), effects are expected to be short-term and minimal.

Cumulative Effects of the Alternatives

The PPRFFAs having effects on vegetation are livestock grazing, range improvements, recreation, wildland fire, emergency stabilization and restoration (ESR), weed treatments, habitat restoration, and land and minerals actions. The PPRFFAs effect the vegetation communities by destruction, removal, degradation, creating or changing use patterns, rehabilitation and restoration.

Alternative 1

Alternative 1 would have an additive effect when combined with ESR, weed treatments and habitat restoration resulting in a minimally positive cumulative effect to vegetation, as the actions are geared toward improving vegetation condition. When combined with livestock grazing, range improvements, recreation, wildland fire, Alternative 1 would have a negligible countervailing cumulative effect on vegetation.

Alternative 2

Alternative 2 would have a countervailing effect when combined with beneficial ESR, weed treatments and habitat restoration resulting in a negligible cumulative effect to vegetation. When combined with livestock grazing, range improvements, recreation, wildland fire, Alternative 2 would have a minimally negative additive cumulative effect on vegetation.

Alternative 3

Alternative 3 would have a minimal additive effect when combined with ESR, weed treatments and habitat restoration resulting in a positive cumulative effect to vegetation. When combined with livestock grazing, range improvements, recreation, wildland fire, Alternative 2 would have a minimally additive negative cumulative effect on vegetation.

3.2.6. Livestock Grazing

3.2.6.1. Affected Environment

The EDO administers livestock grazing on 239 allotments, using 91 permits that annually allocate up to 469,148 AUMs (including 98,079 suspended AUMs). Many of these allotments are further divided into pastures to facilitate livestock grazing management practices. Livestock grazing in these allotments has either been addressed, is being addressed, or is scheduled to be addressed in TPRs. These TPRs modify livestock grazing as necessary to conform to Standards and Guidelines and land use plan objectives.

The EDO receives a varied amount of crossing permit applications requesting permission to trail livestock across BLM-administered lands every year. Proposed routes could cross any of the EDO administered allotments if authorized. When trailing livestock, operators plan their routes to avoid roads with high speed traffic, existing concentrations of livestock, routes that are tortuous or longer than necessary, and difficult or impassable geography. They take advantage of fenced fields (including private grounds) with available watering sites that they either own or have permission to use for overnight stops, as well as terrain conducive to orderly and efficient movement of livestock when planning a trailing route. Trailing along fence lines is one means of controlling cattle. Locations of gates are also taken into consideration

when multiple pastures must be crossed. Before beginning a trailing event, livestock operators also must consider weather, soil conditions, range readiness, and other factors when deciding whether destination allotments would be available for use.

3.2.6.2. Environmental Effects

The following assumptions apply for analysis purposes:

- Road conditions would limit the timing of livestock turnout or removal; in some years snow drifts or wet road surfaces could prevent access and/or safe travel (e.g. during spring or after October 1).
- Most of the trailing routes have been in use for many years and in some cases use pre-existing, though expired, livestock driveways or established roadways.

Trailing livestock across an allotment when permitted livestock grazing is occurring could result in the following direct and indirect impacts to forage and livestock/operations:

- Reducing availability of forage for permitted/authorized livestock already present on trailing routes
- Creating resource conflicts, through timing, intensity, or other mechanisms that would not be present under existing grazing permits
- Reducing rangeland health due to cumulative impacts of trailing livestock in addition to permitted livestock on an allotment
- Interfering with the distribution or breeding of permitted livestock
- Increasing cost to maintain, repair, or replace range facilities (e.g. fences, water developments, troughs) used, damaged, or otherwise rendered unavailable due to use by trailing livestock
- Increased cost and time to separate trailed livestock that may intermingle with permitted livestock

Impacts to crossing permit applicants that could result from modifying or denying their applications for crossing permits would include changes in access and cost:

- Temporal modifications to trailing and permitted use of allotments dictated by road conditions
- Potential inaccessibility of some portions of routes or of allotments by trucks, even under favorable road conditions
- Requiring overnight stops outside of fenced fields that would otherwise prevent livestock drift
- Costs incurred by trucking, modified trailing, and possible combinations of the two
- Lengthening of routes requiring additional time to complete the trailing event and/or additional overnight stops
- Lengthy segments with restrictions that would require additional herders for livestock control

Alternative 1- No Crossing Permits Authorized

For grazing permittees, there would be a minor increase in forage availability in both the short (<1 year) and long term (>1 year) because trailing livestock would not trample or consume any AUMs within the allotments. Increased forage availability would be most beneficial during drought years when overall plant productivity is reduced. In above average production years, additional forage availability would have a negligible benefit relative to the overall increase in productivity. In above average production

years, plants may have higher residual biomass leading to higher fuel loading. Trailing-associated interference with permitted livestock, resource conflicts, or range facility costs would not occur resulting in a negligible to minor short-term effect on livestock grazing.

There could be enormous access impacts for crossing permit applicants. All destination grazing areas (allotments or other areas used for grazing) that livestock would be trailed to would have to be accessed by trailing across non-BLM-administered lands or trucking. Destination grazing areas that are not accessible by maintained roads or alternative trailing routes would not be available for use under Alternative 1. Associated cost increases to livestock operations would be moderate to substantial. In the case of sheep, destination grazing areas could not be accessed until lambs are large enough to be trucked without risk of injury (approximately four months).

Under Alternative 1, operators would be required to negotiate with private landowners for trailing access or use county roads. If private lands required for alternative trailing routes could not be accessed, then destination grazing areas would not be available for use. Weather conditions could delay vehicle access for one day to a few weeks causing a negative impact on operators that need to truck livestock. Weather conditions could have a substantial effect on operators that could trail livestock on alternative routes.

Alternative trailing routes could cause moderate to substantial increases in expenses depending on the increase in miles and days required to trail. Currently used routes likely represent the most efficient route for accessing destination grazing areas; therefore, alternative routes would likely be longer and take more time. Facilities and space necessary for bedding might not be available, safe, or feasible. Additionally, harm to animals from trailing along highways or other roads with heavy traffic could occur, especially during spring trailing events with young animals. Costs would increase proportionally with herd size and the need for additional herders, supplies, vehicles, and overnight stays.

Trucking costs would be a minor to substantial expense for cattle operators depending on the distance trucked; sheep would be minor to moderate depending on distance trucked. Additional feeding of livestock herds until they could reach destination grazing areas would add significant costs to operators.

Alternative 2- No Action

Impacts from Alternative 2 would occur primarily when trailing events occur during the growing season, drought periods, or through sensitive habitat. Bedding sites would not be ascertained on the application, if there is one, and impacts could occur at these sites. Operators would not be required to use a bedding area for only one night under Alternative 2 and could cause resource damage to range facilities caused by excessive use. The long-term effects of Alternative 2 could be slight to moderate in instances where inappropriate trailing is occurring and resources are being damaged; this could cause a reduction in rangeland health and associated reduction in permitted AUMs. Negligible to minor effects would occur adjacent to improved roads whereas minor (small to medium herd sizes) to moderate (large to substantial herd sizes) would occur on cross-country routes. Minor short-term impacts would be expected from trailing events that occur outside the growing season and along improved roads whereas minor to moderate impacts would be expected to occur from cross-country trailing events that occur during the growing season.

Disruption to permitted livestock grazing by trailing activities would be minor to moderate and short-term because many allotments consist of numerous pastures, livestock would not always be present in the same pastures as a trailing event. Coordination and communication between grazing permittees and trailing permittees would not be required and conflicts could occur. Impacts could occur where trailing and grazing livestock breeds are incompatible, trailing bulls disrupt grazing cows and calves or attempt to breed with grazing cows, sheep bands intermingle, or when grazing livestock are being moved between areas concurrent with the presence of trailing livestock. Overlap of livestock trailing and authorized livestock grazing could occur. Many of these trailing routes have been in use for years and BLM has not been made aware that these conflicts pose any threat or cost to ongoing grazing activities.

For crossing permit applicants there would be no effect on the ability of applicants to access destination feeding areas because traditional trailing routes would be permitted. There would be no increase in trailing costs beyond those normally incurred during trailing.

Alternative 3- Proposed Action

Impacts to forage utilization would be similar to those described for Alternative 2, but locations and effects would be known, and the stipulations would reduce effects to forage. There would be a negligible increase in forage availability where cross-country routes were modified to unimproved and improved roads.

Impacts from livestock/operational conflicts would be lessened when compared to Alternative 2 due to the known routes and required consultation, cooperation and coordination with interested public. Applications would be reviewed prior to trailing to eliminate conflicts whenever possible.

For crossing permit applicants, effects to access would be similar to Alternative 2, with some required changes in routes depending on impacts to resources. Traditional routes would be authorized if no such impacts are discovered, or if an acceptable design features can be applied. Route changes would have minor impacts on trailing costs to the overall route mileage. Requirements to reduce route widths in BLM Sensitive Species habitat, vegetation treatments, post-burn areas, and avoidance of noxious weed locations and cultural sites would have negligible to minor short-term impacts because of potential increased herding costs. Implementation of soil moisture criteria could have a negligible to minor short-term impact where spring trailing events were delayed until criteria were met. Some feeding costs could be incurred by the delay.

Cumulative Effects of the Alternatives

PPRFFAs that have impacted, are currently and will likely continue to impact livestock management in EDO are livestock grazing, wild horse management, recreation, minerals and lands actions, weed treatments, habitat restoration, wildland fire and ESR.

Alternative 1

Alternative 1 would have an additive positive cumulative effect when combined with weed treatments, habitat restoration, and ESR as the effects would benefit rangeland health, and in turn livestock grazing; when combined with wildland fire, wild horse management, recreation and minerals and lands actions, there would be a negligible countervailing cumulative effect as there could be increased disturbance, a reduction in rangeland health and a loss of available AUMS. Alternative 1 combined with livestock

grazing would have a negligible countervailing cumulative effect, as the benefits to livestock permittees would be balanced by deficits to crossing permit applicants, and improvements to rangeland health from removing crossing permit trailing would be balanced by possible reductions to rangeland health by altering use patterns.

Alternative 2

Alternative 2 would have a negligible countervailing effect when combined with weed treatments, habitat restoration, and ESR, as current practices could contribute to reductions in rangeland health in places while treatments increase rangeland health in others. Alternative 2 would have an additive negative cumulative effect when combined with wildland fire, minerals and lands actions, and wild horse management as there could be increased disturbance, possible reduction in rangeland health and potential loss of AUMS.

Alternative 3

Alternative 3 would have an additive positive cumulative effect when combined with weed treatments, habitat restoration, and ESR, as these actions would benefit rangeland health, and in turn livestock grazing. Alternative 3 would have a negligible countervailing cumulative effect when combined with wildland fire, minerals and lands actions, and wild horse management as these other action could increase disturbance, cause possible reductions in rangeland health and a potential loss of AUMS.

3.2.7. Fire Management

3.2.7.1. Affected Environment

The EDO is located in the Great Basin, where climate varies by elevation, latitude, and other factors. Higher elevations tend to be cooler and receive more precipitation. Most of the basin experiences a semi-arid or arid climate with warm summers and cold winters. However, some of the mountainous areas in the basin are high enough in elevation to experience an alpine climate. Due to the region's altitude and aridity, most areas in the Great Basin experience a substantial temperature variation between the days and nights. The topography is typical of the Great Basin with broad valleys separating mountain ranges. Elevations range from 4,000 to 10,000 feet. Vegetation types range from salt desert shrub communities to sagebrush and perennial grasses to pinyon-juniper woodlands to mixed conifer stands at the higher elevations. See Section 3.2.5.

Historically, throughout the EDO the main cause for wildland fire ignitions is lightning. Lightning caused fires are typical as increased moistures moves up from the south out of the Gulf of Mexico and over the Great Basin. Typically, thunderstorms move from the southwest to the northeast across the EDO and it is common to have several lightning caused fires to occur on the same day. Multiple fire days tend to account for most of our large fire occurrences.

A wide range of wildfire behavior may be exhibited in the project area depending on fuels, weather and topography. Sagebrush and annual grassland fires may result in high intensity fires with rapid rates of spread, while fires in perennial grasslands are often less intense. The concentration and values of resources at risk vary throughout the project area. Fire behavior and resources at risk dictate in large part the priorities, objectives and strategies for fire management.

Over the past ten years EDO has burned an average of 216,512 acres per year with an average of 139 fires per year. The number of fires and acres burned can vary greatly from one fire season to another: the most active fire season was 2006 with 970,630 acres burned and 265 fire starts, and the least active fire season was 2009 with 946 acres burned with 86 fire starts. There is no direct correlation between the number of fire starts and the number of acres burned in any given year- there are three years with fewer fire starts and more burned acres per year. The lack of correlation is inconsequential because fire year severity is measured by acres burned not by the number of starts. Depending on all of the variables, which include topography, fuels and weather that contribute to wildfire severity there can be vast differences in the severity of any given year.

Impacts of wildland fire are not desired in most areas and suppression priority is based on resource values with the protection of human life being the single overriding priority. The BLM's highest resource priority is to reduce the amount of Greater sage-grouse (GRSG) habitat loss due to wide-spread wildfires and invasion by nonnative species. Fires that ignite can spread quickly in these types of fuels and escaped fires can easily reach the limits of initial attack response. Many areas have been modified significantly from their historical fire regime through the introduction of invasive annual grasses which create a continuous and hazardous fuel bed. As more fires occur in these areas, annual grasses may increase and the departure from the historical fire regime will continue the cycle of large fire occurrence.

GRSG habitat on BLM-administered lands in the project area consists of lands allocated as priority habitat management areas (PHMA), general habitat management areas (GHMA), other habitat management areas (OHMA), and sagebrush focal areas (SFA). Those lands not classified as GRSG habitat management areas are classified under EDO BLM's General Fire Management framework and strategy represented by four Fire Management Categories (FMCs A through-D, listed below). Activities described for the prevention, response and rehabilitation components may be applicable to other components as defined in the September 2004 Approved Elko/Wells Resource Management Plans (RMP) Fire Management Amendment (FMA) and Decision Record.

- FMC A – Full Suppression. This strategy for maximum suppression activity applies to areas where wildland fire is not desired at all. These include the urban interface, active mining operations, oil and gas fields, recreation sites, critical watersheds, and areas of significant weed infestation. Fuels reduction activities are acceptable, but prescribed fire opportunities are limited due to the close proximity of structures and improvements.

- FMC B – High Suppression. This category applies to areas where wildfire is likely to cause negative effects, but these effects could be mitigated or avoided through fuels management, prescribed fire or other strategies. The strategy includes a less strict acreage guideline than FMC A and vegetative treatments to reduce fuel loading as a management technique to a greater degree than in FMC A. Unplanned ignitions are managed using the most appropriate and cost-effective suppression response based on threats to life, safety, structures, developments and other resource values. Where streams, riparian areas, or watersheds exist that provide habitat for federally listed threatened, endangered, or candidate species, suppression tactics will include appropriate standard operating procedures (SOPs) for species protection, except when a threat to human life exists. Mechanized equipment use will be consistent with applicable guidelines, including current guidelines for Greater Sage-Grouse and sagebrush ecosystems.

- FMC C – Moderate Suppression. This applies to areas where fire may be desirable to manage ecosystems, but where various factors place constraints on fire use for resource benefit. These areas may have larger acreage guidelines than FMC B and can include increased use of vegetation manipulation. Unplanned ignitions are managed using the most appropriate and cost-effective suppression response based on threats to life, safety, structures, developments, and other resource values. Where streams, riparian areas, or watersheds exist that provide habitat for federally listed threatened, endangered, or candidate species, suppression tactics include appropriate SOPs for species protection, except when a threat to life exists. Mechanized equipment use will be consistent with applicable guidelines, such as for Greater Sage-Grouse and sagebrush ecosystems.

- FMC D – Limited Suppression. This strategy applies to areas where fire is desired under various environmental conditions and there are few constraints associated with resources or social, economic or political considerations. These areas receive the least level of suppression, some level of fire use for resource benefit and can include the extensive use of prescribed fire. Mechanized equipment use is consistent with applicable guidelines, including the Interim Management Policy for Lands under Wilderness Review. For the EDO these areas would be limited to Wilderness Study Areas (WSAs), the Cherry Creek Range, and areas analyzed under the 2011 Spruce Mountain Restoration EA.

Within the Great Basin, and primarily in historic sagebrush steppe and salt desert shrub lands, fire return intervals range from 40-100 years between wildfire events. With the introduction of cheatgrass to many sites, much of the fire return intervals have been reduced to 3 – 10 years. Fires within this fuel type have the potential to burn large landscapes and have lasting impacts on many resources and habitats. Cheatgrass established on sites tend to green up earlier than perennial vegetation and outcompete such perennials for available resources in the soil. In turn, cheatgrass sets seed and dries out much earlier than native perennial vegetation. The presence of cheatgrass on the site allows for fire to burn earlier in the year than historically observed, often times before perennial vegetation has set seed. The reduced fire return intervals greatly favor the establishment of more cheatgrass to the sites, potentially creating a cheatgrass monoculture within a few wildland fire events.

3.2.7.2. Environmental Effects

Impacts to wildland fire by livestock trailing depends on trailing frequency, location, and timing, type and number of livestock, rate of livestock movement, location of concentrated use areas (e.g. bedding), land slope and aspect, vegetation, climatic conditions during and after trailing, and soil type, texture, and erosion susceptibility. For example, trailing in a narrow area, combined with a high number of livestock, would be more likely to impact wildland fire by reducing or removing vegetation. Vegetation trampling impacts related to trailing is discussed in Section 3.2.5.

Under all of the alternatives discussed, there is still potential for wildland fires, and during extreme conditions, wildland fires may grow quickly and cover large landscapes. With proper vegetation management and improved health and vigor of vegetation communities, the negative impacts associated with wildland fires would be reduced. Wildland fire plays a natural part in ecosystem management.

Alternative 1- No Crossing Permits Authorized

Under this alternative direct and indirect effects to Fire Management would occur, as wildland fire would not be removed from the project area and may increase over time. With the reduction of livestock grazing occurring under this alternative, no fine flashy fuels would be reduced, therefore posing a higher risk of wildland fires. Grasses and forbs growing amongst the sagebrush in shrub-dominated communities would allow for fire to carry through shrub dominated sites without the presence of high winds. Increased risk of wildland fires moving from grassland dominated sites to shrub dominated sites may occur and the negative impacts associated with shrub dominated wildland fires would continue or increase. Increased fire intensities may occur and may allow for noxious non-native species to become established and expand. Annual fluctuations in vegetation and litter cover would affect expected rates of fire spread in areas where trailing is no longer occurring. These effects would be minor to negligible, as grazing while trailing is a very small fraction of the fuel reduction benefits of livestock grazing.

Alternative 2- No Action

Under this alternative, direct and indirect effects to Fire Management would continue to occur, and rangelands would remain at risk to wildland fire under current conditions. However, wildland fires that are driven by grasses and forbs would continue to have increased rates of spread, increased odds of escape from initial attack and minimal residency times on the land. Effects from wildland fires carried by grasslands tend to be less destructive than the wildland fires carried by sagebrush and larger fuel quantities, but as fire frequency increases, negative effects associated with fires would happen more often. Wildland fires carried by brush burn with extreme heat and have longer residency times over the land; brush dominated sites that are impacted by wildland fires tend to have much less recovery and provide a vector for noxious non-native species. With shrub dominated landscapes the fire frequency would be decreased, however the intensity of fires would increase and negative effects associated with higher intensity fires would also increase. Under current management noxious and invasive weeds have been introduced to the landscape, see also Section 3.2.9. Prolonged presence of noxious and invasive weeds would pose an increased risk of wildland fire; however, impacts associated with wildland fires would be similar to grass and forb driven fires. With the increased fire interval it would allow the spreading of weeds to increase with each fire and heathy vegetation communities would be at risk to recover without restoration required. Future fires would burn depending on existing fuels, weather, topography, and be unimpeded by changes in the fuel bed that would alter fire behavior and decrease resistance to control. Increases in cover of annual grasses which may result from recent large fires may increase the occurrence of fires with extreme fire behavior, including high flames lengths, rapid rates of spread and a high probability of escaping initial attack.

Alternative 3- Proposed Action

Under this alternative wildland fire would not be removed from the project area; however, resiliency of the landscape would improve. The direct and indirect effects of the stipulations would aid in the reduction of undesired environmental degradation. Vegetative vigor, recovery, and resiliency from wildland fire would be expected to increase due to the reduction in nonnative annual species. The reduction of environmental concerns within the area would allow for more nutrients and resources to be made available to perennial vegetation on these sites. The risk of wildland fire would continue; however,

negative effects associated with wildland fire would be decreased due to the increased health of the vegetation communities prior to wildland fires. Healthier perennial vegetation tends to hold higher live fuel moistures later into the summer months and would deter fire movement through the area. Healthier perennial vegetation impacted by fire has a greater success of re-establishment after a wildland fire occurs on the site. Additional measures such as feeding livestock weed free forage, avoidance of ESR treatment areas, alternate routes if needed and cleaning vehicles prior to arrival would help reduce potential environmental degradation. For these reasons, coupled with the anticipated short duration of direct effects, this alternative's impacts are expected to be minor.

Cumulative Effects of the Alternatives

PPRFFAs for fire management include livestock grazing, recreation, and implementation of fuels reductions, and ESR and habitat restoration activities.

Alternative 1

The cumulative effects of Alternative 1 would have an additive negative effect when combined with recreation due to the increased risk of ignitions and the reduce consumption of fine fuels by livestock; Alternative 1 would have a countervailing positive effect when combined with livestock grazing, fuels reductions, ESR and habitat restoration activities because of the improvement of vegetative health and resilience to wildland fire. Therefore, the cumulative effects would be negligible.

Alternative 2

Under the No Action alternative would have a countervailing effect when combined with recreation, and an additive effect when combined with livestock grazing, ESR and fuels reductions and habitat restoration activities. There is still potential for wildland fires, and during extreme conditions, wildland fires may grow fast and cover large landscapes. With proper vegetation management and improved health and vigor of vegetation communities the negative impacts associated with wildland fires would be reduced. Fuel loading can be reduced by livestock grazing, however the location of the reductions would be unknown. Therefore, the cumulative effects would be beneficial but minimal.

Alternative 3

The cumulative effects of the Proposed Action would have a countervailing effect when combined with recreation, and an additive effect when combined with livestock grazing, ESR and fuels reductions and habitat restoration activities. Fuel loading can be reduced by livestock grazing and recreation can increase the chance of human caused fire. Therefore, the cumulative effects would be beneficial but minor.

3.2.8. Recreation

3.2.8.1. Affected Environment

The BLM provides for outdoor recreation as part of the "multiple-use" principle, recognizing that recreation and tourism play an important and growing role in public land management. The EDO administers approximately 20 hunting outfitter and guide Special Recreation Permits (SRPs); approximately 60 active hunting SRPs statewide which may offer guiding service within the district; one guest ranch SRP; and typically 2 or 3 competitive OHV event permits issued annually. SRPs are

customer-driven and discretionary, so the number that will be applied for annually is not static. The variety of recreational opportunities available in the project area range from primitive opportunities in remote locations to large, organized off-road racing competitions. These recreational opportunities are primarily dispersed in nature, meaning the activities are resource dependent where visitor services and recreational developments are minimal. Activities include camping, hunting, boating, fishing, hiking, target shooting, rock hounding, photography, birding, and exploring back roads and trails by car, OHV, mountain bike and horseback. Outdoor recreation in the EDO has become increasingly popular, particularly OHV use on public lands, which are the most likely recreational users to encounter or be impacted by trailing operations. Below is a table of the EDO's recreation facilities.

Table 6. EDO BLM Recreation Facilities

NAME	FACILITY	FIELD OFFICE
Zunino-Jiggs Campground	Campsites, Vault Toilets, Reservoir, Boat Launch	Tuscarora FO
Tabor Creek Campground	Campsites, Vault Toilets	Wells FO
Wilson Reservoir Campground	Campsites, Vault Toilets, Boat Launch, Dock	Tuscarora FO
Wild Horse Campground	Campsites, Vault Toilets, Picnic/Shade Structures	Tuscarora FO
Salmon Falls Special Recreation Management Area	Primitive Use Area, Stream Access	Wells FO
South Fork Canyon Special Recreation Management Area	Primitive Use Area, River Access, Historic Trail	Tuscarora FO
California Historic Trail Back Country By-Way	County Maintained Road, Signage	Wells FO

3.2.8.2. Environmental Effects

Alternative 1- No Trailing Permits Authorized

Under Alternative 1 general impacts to the visitor would be a decrease in potential for delays, or direct encounters with livestock, while travelling primitive areas or back roads, where trailing operations are occurring. However, under Alternative 1, trailing activities could be replaced by vehicular transport of livestock. This would require large trucks and trailers be used to haul livestock, potentially causing dust/visibility safety issues, impeding traffic, increasing wear and damage to unimproved or minimally-maintained roads and the associated sights, sounds of large-scale, mechanized transport of animals. While this could decrease the potential negative encounters with livestock or LGDs present during trailing, there may be an overall loss in the visitor perception of naturalness and solitude, impacting the back country recreation experience. The effects on recreational opportunities from Alternative 1 would be slight and would result in a small but detectable change in the quality of the visitor experience.

Alternatives 2- No Action and 3- Proposed Action

The effects of Alternatives 2 and 3 on the recreation resource would be the same. Trailing would have localized, short term effects on users that unexpectedly encounter livestock animals while recreating. While effects may be short term to any one person, the total number of individuals affected could be greater during summer and hunting seasons. Trailing activities may increase the likelihood of rare

conflicts between livestock, LGDs and the public, particularly if a recreationist is mountain biking, riding horseback or travelling on foot. LGDs are bred and trained to bark or aggressively defend against potential threats to the sheep, which could potentially result in unintentional property damage, injury or death to recreationist in an escalated, unanticipated conflict. OHV users could potentially overlook trailing activities or animals in low light, dusty, high-speed or terrain-obscured situations, resulting in damaging collision with livestock, LGDs or herders. Bedding, watering or trailing through areas where members of the public are staging or camping would also increase potential for conflict. Indirect impacts may occur to recreational users by the perceived changes in the naturalness of an area when livestock are encountered or evidence left behind of livestock bedding or watering (e.g. heavily trampled vegetation or abundant feces).

Trailing livestock has the potential to enhance the visitor experience. It provides the recreationist an opportunity to observe a seldom seen, rustic way of life that is unique in modern, highly-industrialized society. An up-close encounter with sheep, cattle, working dogs, saddle horses and herders may be considered by some recreationists as being living history and a natural part Western rangelands. Alternative 3 would allow BLM staff to minimize conflicts through better communication between operators and recreationists, scheduling, monitoring and support, as needed, than Alternative 2. Permitted trailing may coincide with other events authorized on public lands, i.e. competitive OHV races, historical education events, mountain bike races. Alternative 3 would also allow for better mitigation of potential conflicts between permitted recreation events, SRP holders (hunting outfitters and guides), their clients, public and the livestock operator. However, effects from these alternatives would overall be negligible.

Cumulative Effects of the Alternatives

PPRFFAs having effects on recreation are range improvements, lands and minerals actions, wildfire and suppression activities, travel management and LCT reintroduction.

Alternative 1

The cumulative effects to recreation from Alternative 1 when combined with the PPRFFAs would be minor to negligible. For some recreationists, this would enhance the solitude experience while for others, livestock trucking activities would diminish the naturalness of outdoor recreation.

Alternatives 2 and 3

These cumulative effects to recreation from Alternative 2 or 3 when combined with the PPRFFAs would be negligible. The quality of recreational opportunities would be maintained, while visitor experiences would not show a noticeable change. Permitted, scheduled trailing activities could have the potential to mitigate or avoid conflicts to potential recreational events.

3.2.9. Noxious and Invasive Weeds

3.2.9.1. Affected Environment

A noxious weed is any plant designated by federal, state, or county government to be injurious to public health, agriculture, recreation, wildlife, or any public or private property (Sheley and Petrof, 1999). In

Nevada, noxious weeds are defined as "any species of plant which is, or likely to be, detrimental or destructive and difficult to control or eradicate (Nevada Revised Statute [NRS] 555.005)." The Nevada Department of Agriculture (NDA) administers the State Noxious Weed Law (NRS 555) and maintains a list of noxious weeds (Nevada Administrative Code 555.010). Each plant is assigned a category based on current infestation amount, distribution in the state of Nevada, and control priorities, with A-rated species being the highest management priority.

Executive Order 13112 defines an invasive species as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The BLM defines an invasive weed as a "non-native plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition, and diversity of the site it occupies." The BLM actively manages both noxious weeds and invasive species. Priority is placed on Nevada noxious weeds, early detection and rapid response (EDRR) species (typically new invaders or small, isolated populations where immediate action is necessary and eradication is possible), and weeds that interfere with restoration (i.e. cheatgrass in ESR efforts) or have a high use/probability of spread (i.e. recreation sites).

Noxious weeds and non-native, invasive plants have often been accidentally introduced into an environment where they did not evolve (i.e. non-native) and as a result these species usually do not have any natural enemies to limit their reproduction and spread (Westbrooks 1998). Consequently, these plant species have the ability to readily establish and spread quickly, particularly in disturbed areas, and may cause damage to riparian and rangeland resources, as well as increase fire susceptibility. Noxious weeds and non-native, invasive plants are introduced and spread by a variety of means including vehicles, equipment, animals (wild and domestic), wind, and water. Once established on site, weed species are difficult to control due to their great competitive ability for resources, prolific seed production, often more than one means of reproduction, and long seed dormancy (Zimdahl 2007) enabling them to spread throughout project locations and along travel corridors.

Noxious weeds and invasive plants are widely scattered throughout EDO in varying degrees and densities. Based on BLM resource specialist observations, existing data, and input from partners/cooperators (i.e. Cooperative Weed Management Areas and Conservation Districts) there are 24 noxious weeds and/or high priority invasive plants known to occur in EDO (see Table 7 below). These weed species are predominantly located along roadways, riparian corridors, previously burned areas (wildland wildfire), range improvements, and/or associated with ground disturbance activities such as mining and exploration and realty/lands projects.

Table 7. Noxious Weeds and High Priority Invasive Plants Known to Occur in EDO

Common Name	Scientific Name	Status[1]	Areas of Concern (County)
African wiregrass	*Ventenata dubia*	invasive	Elko
Black henbane	*Hyoscyamus niger*	Category A, noxious	Elko, Eureka
Camelthorn	*Alhagi maurorum*	Category A, noxious	Elko
Canada thistle	*Cirsium arvense*	Category C, noxious	Elko, Lander, Eureka
Diffuse knapweed	*Centaurea diffusa*	Category B, noxious	Elko, Eureka
Dyer's woad	*Isatis tinctoria*	Category A, noxious	Elko

Common Name	Scientific Name	Status[1]	Areas of Concern (County)
Hoary cress	*Cardaria draba*	Category C, noxious	Elko, Lander, Eureka
Houndstongue	*Cynoglossum officinale*	Category A, noxious	Elko, Eureka
Leafy spurge	*Euphorbia esula*	Category B, noxious	Elko
Mayweed chamomile	*Anthemis cotula*	Category A, noxious	Elko
Medusahead	*Taeniatherum caput-medusae*	Category B, noxious	Elko, Eureka
Musk thistle	*Carduus nutans*	Category B, noxious	Elko, Lander, Eureka
Perennial pepperweed	*Lepidium latifolium*	Category C, noxious	Elko, Eureka
Perennial sowthistle	*Sonchus arvensis*	Category A, noxious	Elko
Poison-hemlock	*Conium maculatum*	Category C, noxious	Elko, Eureka
Puncturevine	*Tribulus terrestris*	Category C, noxious	Elko
Russian knapweed	*Acroptilon repens*	Category B, noxious	Elko, Lander, Eureka
Salt cedar	*Tamarix spp.*	Category C, noxious	Elko, Lander, Eureka
Scotch thistle	*Onopordum acanthium*	Category B, noxious	Elko, Lander, Eureka
Spotted knapweed	*Centaurea maculosa*	Category A, noxious	Elko
Squarrose knapweed	*Centaurea virgata*	Category A, noxious	Elko
Sulfur cinquefoil	*Potentilla recta*	Category A, noxious	Elko
Waterhemlock	*Cicuta maculata*	Category C, noxious	Elko, Eureka
Yellow starthistle	*Centaurea solstitalus*	Category A, noxious	Elko

1 Options include invasive, A, B, or C. Invasive species are identified per Executive Order 13112. NRS Categories for Nevada noxious weeds are as follows: Category A weeds are weeds that are generally not found or that are limited in distribution throughout the State. Such weeds are subject to: active exclusion from the State and active eradication wherever found and active eradication from the premises of a dealer of nursery stock; Category B weeds are weeds that are generally established in scattered populations in some counties of the State. Such weeds are subject to active exclusion where possible and active eradication from the premises of a dealer of nursery stock; Category C weeds are weeds that are generally established and generally widespread in many counties of the State. Such weeds are subject to active eradication from the premises of a dealer of nursery stock.

Additionally, numerous invasive non-native plant species not considered noxious weeds (or high priority invasive species) occupy the uplands and riparian areas in EDO to varying degrees and densities. These plants are more widespread and abundant than noxious species. The more common invasive species include: cheatgrass, Russian thistle, halogeton, tumblemustard, bur buttercup. Descriptions are provided immediately below.

> **Cheatgrass** is an invasive annual grass that has become established in EDO generally in disturbed areas (i.e. burned communities with reduced native perennial grasses), typically below 6,500 feet in elevation. This species is persistent and its potential for expansion is virtually unlimited. The ability of cheatgrass to germinate in the late winter/early spring prior to other species and again in the fall, give it a competitive advantage for nutrient and moisture acquisition.

Russian thistle is an early successional annual that grows best in sites with little competition from other species. Seeds remain viable for less than one year, but are readily dispersed by rolling plants in the wind.

Halogeton is a common annual in disturbed areas, primarily along roads in salt desert shrub and low-elevation shrub steppe communities below 6,000 feet in elevation. It is a weak competitor that has occasionally expanded into depleted communities adjacent to disturbed areas.

Tumblemustard occurs in a variety of the habitats identified in EDO, but thrives in areas with little plant litter such as roadsides and other disturbed places (i.e. mammal burrows). It is not highly invasive in undisturbed sagebrush communities.

Bur buttercup is an annual species that emerges and sets seed in the early spring when temperatures are low and before any native species have started their growth. This plant thrives in waste areas and roadsides, forming low dense mats. The spiny seeds are easily transported on animal fur or vehicles.

Integrated weed management strategies used in EDO include prevention and education; inventory; chemical, manual, mechanical, biological, and re-vegetation treatments; and monitoring. A combination of these methods, used individually or together, offers the greatest flexibility and success for managing noxious and invasive weeds on public lands.

3.2.9.2. Environmental Effects

A combination of impacts (i.e. disturbance, preferential grazing of herbaceous perennials, and weed seed transport) could increase noxious and invasive weeds along trailing routes and in concentration areas such as bedding, watering, and staging areas. Damage to native plants and soils can reduce a plant's overall productivity and competitiveness, creating niches for invasive species to occupy. Moist conditions and openings in ground cover created by hoof action (or vehicle tires) provide opportunities for germination and spread of invasive plants. Noxious and invasive weeds in EDO, as they relate to trailing activities, are associated with roads, range improvement projects (i.e. reservoirs and springs), and riparian corridors.

Alternative 1- No Crossing Permits Authorized

Restricting trailing activities to non-BLM roads, publically maintained roads (roads that pass through BLM administered lands), State managed lands, and private lands would reduce the potential for cross country introductions and spread directly onto BLM administered lands. However, the existing weed infestations known to occur on roads would persist and are anticipated to spread due to the increased livestock movement and vehicle traffic, which could spread weed seed on tires and through increased road maintenance activities. Infestations that occur along roadways (especially those that pass through BLM administered lands) pose an indirect risk of spreading to BLM lands since weeds often move from their point of introduction (i.e. roads) into rangelands. Rangelands that have experienced a disturbance (i.e. recent wildland fire, historic overuse, etc.) or possess a lower native/desirable plant community component are more susceptible to invasion. Despite the lack of stipulations, this alternative is expected to have negligible to minor impacts to noxious weeds and invasive plants.

Alternative 2- No Action

Under this alternative, trailing is allowed cross-county, on roadways, and within/along riparian corridors without the implementation of any stipulations to minimize weed introduction and spread. The effects of trailing on the spread of noxious and invasive weeds are expected to be moderate at site specific locations within and directly adjacent to trailing corridors.

Non-native invasive species (i.e. cheatgrass) generally have larger, more widespread infestations than noxious/high priority species (see Table 7) and, with the exception of post-wildland fire ESR activities, mostly have not been treated. Therefore, trailing would likely have a greater effect on the spread of these invasives than on the spread of noxious/high priority weeds. Where invasive plants are dominant in trailing corridors, moderate effects could be expected, particularly on cross-country travel routes and in bedding/watering areas; however, where invasive species are not dominant but are present, or trailing occurs along roads, negligible to minor effects would occur.

Plant communities above 6,500 feet elevation would be less prone to increases in weed spread than those in lower elevations. Increased effective precipitation in the higher elevations often result in higher perennial plant cover that can resist invasion. Lower elevation areas tend to have a higher cover of invasive weeds and lower precipitation and are more susceptible to invasion and or continued weed persistence on sites currently infested.

Alternative 3- Proposed Action

Compared to Alternative 2, stipulations would be implemented in order to reduce the introduction and spread of noxious and invasive weeds. These measures would track livestock movement via pre-approved/planned trailing routes to avoid noxious and high priority weed species, allow the modification of trailing timing to avoid optimal weed spread (i.e. seed set), and enable the recording of trailing activities (e.g. GPS overnight watering or bedding areas to facilitate future monitoring) for increased detection of new infestations or possible introductions. Additional measures such as feeding weed-free forage and cleaning vehicles prior to arrival would prevent new weed species introductions. For these reasons, coupled with the anticipated short duration of direct impacts, this alternative's impacts are expected to be minor.

Cumulative Effects of the Alternatives

PPRFFAs that have impacted and will likely continue to impact the spread and establishment of weeds in EDO are livestock grazing and trailing (including wild horse and burro), recreation, ground disturbance activities (i.e. road construction/maintenance, mineral exploration, right-of-way development, and high-intensity wildfire), and weed management activities. In general, grazing, recreation, and ground disturbance activities have aided in weed establishment and spread, whereas post-wildland fire rehabilitation, fuels treatments (i.e. cheatgrass control), and weed treatment activities (inventory, treatment, monitoring, education/prevention, and cooperative agreements and partnerships) have resulted in beneficial effects to weed management.

Alternative 1 – No Crossing Permit Authorized

Trailing corridors would be associated primarily with roads, where vegetation has already been altered or removed by other activities (i.e. road maintenance, OHV use). Furthermore, most priority noxious and invasive weeds mapped along roads, especially publically maintained roads (roads that pass through BLM administered lands), have been and/or will continue to be treated, thereby minimizing spread potential.

Cross country travel of trailing livestock on State or private lands immediately adjacent to BLM administered lands that contain weed infestations have potential to spread onto BLM lands in EDO; however, these introductions and spread would be difficult to distinguish from normal and on-going grazing activities.

When trailing is combined with other PPFFAs that are potentially ground disturbing (minerals, realty, road maintenance, wildland fire) and/or considered as mechanisms of spread (exiting livestock use, wild horse and burro, recreation, road maintenance), cumulative impacts are expected to be minor.

Alternative 2 – No Action

Higher elevations (>6,500 feet) are less susceptible to weed spread because of higher effective precipitation and the condition of the plant communities, which is composed primarily of native to mid-to-late seral sagebrush steppe communities (i.e. sagebrush species and perennial herbaceous species). Previous disturbances (i.e. livestock grazing, OHV use, roads) have facilitated weed spread in higher elevations, but are primarily restricted to roadsides. Negligible additive impacts to noxious weeds and invasive species from trailing would be expected in upper elevations.

Lower elevations, would be more likely to have cumulative impacts from other management activities such as previous and current livestock grazing and facilities/infrastructure than trailing related activities. Because the lower elevations are already in a partially invasive species-dominated state, an overall increase in weed distribution would be minor.

Wildland fire annually burns several thousand acres in EDO, see Section 3.2.7. This would result in damage, mortality, and/or alterations in plant community components, potentially opening niches for noxious and/or invasive species to inhabit. However, vegetation treatments (rehabilitation and restoration) which produce vigorous, more desirable plant communities over the long-term, would have a competitive advantage and could limit weed invasion. Fuel breaks, such as those analyzed in established or pending site specific projects such as the O'Neil Project Planning Area EA, could also limit weed invasion or spread over the long-term by protecting desirable vegetative communities and limiting disturbance associated with wildland fire.

Cooperative weed management partnerships, treatments, and education outreach activities would partially offset any increase in noxious weeds resulting from livestock trailing activities. Total eradication of noxious weeds would be difficult if not impossible to attain and unlikely give the budget and staffing at federal and state levels. However, biological control agents (including bio-pesticides to target annual grass species) are becoming increasingly effective on some weed species, and more of these agents are likely to become available in the near future. The cumulative increase in noxious weeds from issuing the crossing permits would be negligible to minor.

While the effects to noxious weeds and invasive species resulting from trailing could be confined to localized areas and narrow timeframes, permitted grazing would be widely dispersed both temporally and spatially making comparison of impacts difficult. The continued application and implementation of Standards and Guidelines would result in proper livestock management thus improving plant community conditions and limiting expansion of noxious and invasive species. Therefore, when Alternative 2 is combined with other PPRFFAs, the cumulative effects to noxious and invasive weeds would be minor.

Alternative 3 – Proposed Action

Cumulative impacts would be similar to Alternative 2. The types of cumulative impacts would be the same as other alternatives; though, the degree would be marginally less than Alternative 2 due to trailing stipulations to reduce weed introduction, weed spread, and protect vegetation treatments and soils (i.e. following wildfire).

3.2.10. Aquatic Special Status Species and Riparian Habitats

3.2.10.1. Affected Environment

3.2.10.1.1. Aquatic Special Status Species

Special status species include species that are listed or proposed for listing as Threatened or Endangered (T&E) under the ESA, species that are Candidates for listing under the ESA, species that are listed by the State of Nevada, and/or species that are on Nevada BLM's list of Sensitive Species. Nevada BLM policy is to ensure that actions authorized, funded, or carried out by BLM do not contribute to the need for a Sensitive species to become listed. Three federally Proposed, Threatened, or Endangered aquatic species exist in the project area: LCT (*Oncorhynchus clarkii henshawi)*, Independence Valley speckled dace (*Rhinichthys osculus lethoporus*), and Clover Valley speckled dace (*Rhinichthys osculus oligoporus*). No proposed species are currently listed in the EDO.

Species designated as BLM Sensitive must be native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range, or

2. The species depends on ecological refugia or specialized or unique habitats on BLM administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM Manual 6840-Special Status Species Management).

Sensitive species known or with the potential to exist within the EDO are listed in Table 8 below.

Table 8. Project Area Known or Potential Aquatic BLM Sensitive Species

Scientific Name	Common Name	Status
FISH		
TROUT		
Oncorhynchus clarkii bouvieri	Yellowstone cutthroat trout	BLM Sensitive
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout	Threatened
Oncorhynchus mykiss gairdneri	Redband trout	BLM Sensitive
Salvelinus confluentus	Bull trout	BLM Sensitive
DACE		
Rhinichthys osculus lethoporus	Independence Valley speckled dace	Endangered
Rhinichthys osculus oligoporus	Clover Valley speckled dace	Endangered
Relictus solitarius	Relict dace	BLM Sensitive
OTHER FISH		
Gila bicolor isolata	Independence Valley tui chub	BLM Sensitive
Prosopium williamsoni	Mountain whitefish	BLM Sensitive
Lepidomeda copei	Northern leatherside chub	BLM Sensitive
AMPHIBIANS		
Anaxyrus boreas ssp.	Boreal toad	BLM Sensitive
Rana luteiventris	Columbia spotted frog	BLM Sensitive
Rana pipiens	Northern leopard frog	BLM Sensitive
OTHER AQUATIC SPECIES		
ARACHNIDS		
Thermacarus nevadensis	Nevada water mite	BLM Sensitive
MAMMALS		
Lontra canadensis	Northern river otter	BLM Sensitive
Sorex palustris	American water shrew	BLM Sensitive
MOLLUSKS		
Springsnail		
Pyrgulopsis humboldtensis	Humboldt pyrg	BLM Sensitive
Pyrgulopsis sadai	Sada's pyrg	BLM Sensitive
Pyrgulopsis vinyardi	Vinyards pyrg	BLM Sensitive
Mussel		
Gonidea angulata	Western ridged mussel	BLM Sensitive
Anodonta californiensis	California floater	BLM Sensitive

Trout

Yellowstone Cutthroat Trout

Yellowstone cutthroat trout inhabits lakes, larger rivers, and small tributary streams. Their diet is comprised of zooplankton, freshwater shrimp, and variety of midge larvae (Gresswell 2011). Yellowstone cutthroat distribution throughout their range and some populations have declined substantially (May, et al.2007). This population is listed as a conservation population due to unique genetic diversity (Mary, et al. 2007). Yellowstone cutthroat trout are native to the Yellowstone River

drainage, which a small region of the Goose Creek system crosses into the North-Eastern corner of Nevada (Map 12). It inhabits the following streams, in the following allotments in the project area: Goose Creek, Little Goose Creek, Piney, Coon Creek, and Trout Creek in the Big Bend and Little Goose Creek.

Lahontan Cutthroat Trout

Historically LCT occupied much of the western Great Basin. LCT occupied most of the Humboldt River system. LCT feed on invertebrates and small fish (Sigler and Sigler 1987). LCT evolved in the harsh conditions of the Great Basin and as such, tolerate elevated water temperatures and reduced oxygen levels found in high desert streams. LCT typically spawn from February to July with eggs incubating in redds into spring to summer. Spawning time and duration of incubation vary relative to stream temperature and water flows. Stream temperature varies by stream within the EDO and is a function of recent climate and elevation. Current distribution is displayed in Map 11.

LCT is a federally listed threatened species in the EDO. The 1995 LCT Recovery Plan identified potential LCT reintroduction streams and are updated in the annual Humboldt Geographic Management Units (GMU) Action Plan (Coffin and Cowan 1995). It is past, present, and foreseeable that reintroductions of LCT populations will continue into the trout's historic habitat (Map 11). Before LCT reintroductions can occur, stream habitat conditions must meet standards to support trout populations.

Redband Trout

Redband trout occupy rivers and streams of the west in the Columbia River drainage. In Nevada, they occur in tributaries of the Snake River. Like other salmonids, they prefer cool, highly oxygenated water of fast moving mountain streams. Although abundance tends to decline as water temperature increases, they do also inhabit warmer, low gradient streams of the high desert. For spawning, these trout require clean gravel substrates that supply sufficient oxygen for embryo development. Redband trout generally feed on plankton, insects, and small fish.

Bull Trout

Columbia River bull trout (Jarbidge River) are found in Nevada but outside of EDO boundaries. The EDO does not manage any habitat for bull trout. This fish occurs on BLM administered by the Jarbidge Field Office in Idaho, and they will make all management decisions. After population declines, the Jarbidge River Distinct Population Segment were listed as threatened on April 8, 1999 as critical habitat. Bull trout spawning and rearing occur primarily in the headwater streams in Nevada on U.S. Forest Service lands. The majority of migratory corridors and overwintering habitat occur on Idaho BLM-administered lands. Migratory bull trout seasonally inhabit the Jarbidge River downstream of the confluence of the East and West Forks to the Bruneau River from October through late June. The boundary of Jarbidge River population includes the entire Bruneau River, although there are no known historic recorded occurrences of bull trout in the Bruneau River. Critical habitat for this population of bull trout consists of the Bruneau River upstream to the Jarbidge River, the East Fork and West Fork Jarbidge River, and several of their headwater tributaries. Bull trout spawning occurs from mid-September through late October as water temperatures decline to 48°F and colder.

Dace

Independence Valley Speckled Dace

Independence Valley speckled dace are restricted to Independence Valley in Elko County, Nevada. The historical range of Independence Valley speckled dace was not known before European settlement, which resulted in manipulating springs for irrigation purposes. It is believed to be derived from an ancestral form of speckled dace similar to the Lahontan speckled dace (*Rhinichthys osculus robustus)* presently occupying the Humboldt River system. The species adaptability allowed it to survive in the smaller wetland system while its other habitats were impacted by invasive largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) (Sigler and Sigler 1987). The Independence Valley Speckled dace is known to occur on private land found in Independence Valley Warm Springs.

Clover Valley Speckled Dace

Clover Valley speckled dace (*Rhinichthys oscululus oligoporus*) is confined to three privately owned spring outflows in Clover Valley in Elko County, Nevada. While accurate life history data for Clover Valley speckled dace is lacking, spawning usually occurs throughout the summer, with peak activities in June and July when water temperatures approach 18 ° C (65 ° F) (Sigler and Sigler 1987). This fish occurs on private land in the Snow Water Lake Allotment in the Clover Valley.

Relict Dace

Relict dace is an isolated species that use habitats of well vegetated springs and streams. In areas where the habitat has been altered, population declines as well as some localized extirpation across its distribution have occurred (Sigler and Sigler 1987). Relict dace feed on plankton and invertebrates. Their distribution in the EDO is relegated to a few sites in the Ruby and Goshute valleys.

Other Fish

Independence Valley Tui Chub

Independence Valley tui chub (*Gila bicolor isolata*) are found in a private Independence Valley warm springs. Recent survey work has shown that tui chub occupy approximately eighty-eight hectares, four of the six spring areas of the marsh, and occupy the main body of Ralph's Warm Springs Marsh, but they are not as widespread as the co-occurring speckled dace due to overlapping habitat requirement with invasive largemouth bass.

Mountain whitefish

Mountain whitefish require medium to large streams with a minimum pool depth of four feet. They feed on the bottom and inhabit low sections of pools. The spawning season starts when water temperatures are 2-6 °C (36- 43 °F), from October to early December; young whitefish also provide food source for larger trout. In recent years there has been a steep decline in whitefish populations. Current distribution in the project area is limited to the Bruneau, Jarbidge, and South and East Fork Owyhee Rivers.

Northern Leatherside Chub
The habitat of Northern leatherside chub consist of pools and slow backwaters of streams and small rivers that usually have mud or sand substrates. Adults occur in rocky flowing pools, sometimes riffles or cold creeks and small to medium rivers. Young occupy bushy areas or quiet pockets near shore. These chub feed on small invertebrates and stream drift. Northern leatherside chub is found in extreme northeastern Nevada in the Goose Creek system.

Amphibians

Boreal Toad
Boreal toads use a wide variety of habitats including springs, streams, meadows, marshes, woodlands, wetlands, and agricultural land. They also to use ponds, lakes, reservoirs, and slow-moving rivers and streams in Great Basin sagebrush and pinyon-juniper ecosystems. These toads undertake seasonal migrations to and from breeding sites. Newly metamorphosed young migrate from large aggregations and migrate en masse to upland foraging areas. This species exhibits breeding site fidelity. Western toads are active from January to October, depending on latitude and elevation. Eggs are laid in open water from February to July, with peak activity occurring in April. The most significant threat to boreal toads is habitat alteration, resulting in the loss of wetlands used for feeding, breeding, hibernating, and migrating.

Columbia Spotted Frog
Columbia spotted frogs inhabit springs, seeps, meadows, marshes, stock ponds, streams, and other areas where there is abundant riparian vegetation. They often migrate along riparian corridors between habitats used for spring breeding, summer foraging, and winter hibernation. The most substantial known threat to spotted frogs is habitat alteration, leading to the loss of wetlands used for feeding, breeding, hibernating, and migrating. Reduction or loss of habitat can be attributed to recent drought conditions, spring developments, wetland degradation, water diversions, road construction, dam construction, fire, and loss of native beaver populations. Distribution in the EDO is limited to the upper reaches of the Humboldt and Snake River drainages with suitable habitat such as beaver ponds or pool areas that contain mature riparian vegetation.

Northern Leopard Frog
Northern leopard frog requires a variety of riparian habitats, involving aquatic winter and breeding habitats, as well as upland post-breeding habitats and the corridors between them. Various temporary riparian habitats can be used including springs, slow streams, marshes, bogs, ponds, canals, floodplains, reservoirs, and lakes. Permanent riparian habitat has water with rooted aquatic vegetation such as wet meadows and fields. These frogs take cover in underwater niches, or in caves when inactive. The Northern leopard frog overwinters in well-oxygenated but not completely frozen water. Eggs are attached to vegetation just below the surface of the permanent water.

Other Aquatic Species

Nevada Water Mite

The Nevada water mite lives in hot spring environments in western North America. Its life history and exact distribution is unknown due to its rarity. Nevada water mite is predatory towards small macro-invertebrates like chironomid larvae (Heron and Sheffield 2016). There is only one known population in the Deeth Allotment, which was confirmed in 1920; recent attempts to reconfirm presence have been unsuccessful due to site conditions.

Northern River Otter

Northern river otters prefer bog lakes with banked shores containing semi-aquatic mammal burrows and lakes with beaver (*Castor Canadensis*) lodges. They will avoid water bodies with gradually sloping shorelines of sand or gravel. River otter populations have been significantly reduced by habitat loss and fur trapping. River otters are active year-round and are most active at night and during dawn and dusk (crepuscular hours). They become much more active at night (nocturnal) in the spring, summer, and fall seasons, and more active during the day (diurnal) throughout the winter.

American Water Shrew

The American water shrew is most abundant along small cold streams with thick hanging riparian growth; around lakes, ponds, marshes, bogs, and other lentic habitats. Their diet consists primarily of aquatic insects and crustaceans. They are associated with water, but may disperse long distances away from water to establish new territories. The American water shrew tends to breed from December to September and females usually have a three-week gestation period, and offspring are born in the spring and summer. Nest sites are near water in underground burrows, rafted logs, beaver lodges, and other areas providing shelter.

Pyrgulopsis Springsnails

While little is known about *Pyrgulopsis* spring snails' life history, their habitat requirements include cool, poorly oxygenated water in and around springs that are heavily vegetated. Sada's pyrg (*Pyrgulopsis sadai)* is found at a couple spring sites in the Owyhee River drainage and Vinyard's pyrg (*Pyrgulopsis vinyardi*) is found at a few spring sites in the upper Rock Creek drainage. The Humboldt pyrg (*Pyrgulopsis humboldtensis*) is limited to spring sites in the upper Mary's River and East Fork Beaver Creek drainages.

California Floater

The California floater is a freshwater mussel found in both the Humboldt and Snake River basins and inhabit shallow areas of clean, clear lakes, ponds and large rivers. They prefer lower elevations and a soft, silty substrate in which to burrow. California Floater are relatively sedentary filter feeders and the larvae attach to a host fish to disperse.

Western Ridged Mussel

The western ridged mussel is widely distributed from southern British Columbia to southern California, and can be found as far east as Idaho and Nevada. This mussel inhabits cold creeks and streams from low to mid-elevations. Hardhead, Pit sculpin and Tule perch are documented fish hosts for Western ridged

mussel in northern California, although little is known about the fish species that serve as hosts for this mussel throughout other parts of its range. It occurs in both Mary's River and Snake sub-basins in the EDO.

Aquatic Invasive Species

Aquatic invasive species cause damage to systems across the west, primarily, due to their high fecundity and lack of sensitivity towards aquatic habitat quality. In the EDO, New Zealand mud snails (*Potamopyrgus antipodarum*) are the primary aquatic invasive.

3.2.10.1.2. Wetland and Riparian Habitats

Riparian and wetland communities are areas directly influenced by permanent water or seasonably high water tables. These areas have visible vegetation or physical characteristics reflective of lasting water influence. Riparian areas and wetlands generally can be identified by typical riparian vegetation such as cottonwoods (*Populus* spp.), willow (*Salix* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.). Riparian areas provide a transition zone between aquatic and upland areas as well as cover and food for wildlife and fish. These areas also provide water quality benefits by filtering out nutrients from runoff, maintaining stream temperature by providing shade, and controlling erosion. In general, the area along streams where the woody and herbaceous plant community is influenced by the presence of surface and sub-surface water can be referred to as the Riparian Conservation Area (RCA). Human activities and uses within the RCA have the potential to influence riparian condition.

The term "stream" is used to describe a body of flowing water in a natural channel. Streams in a natural channel are classified as being perennial, intermittent or ephemeral and are defined as follows (Dickard et al. 2015):

- **Perennial** – A stream that flows continuously. Perennial streams are associated with a water table in the localities through which they flow.

- **Intermittent** (seasonal) – A stream that flows 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. These streams flow continuously for periods of at least 30 days and usually have visible vegetation or physical characteristics reflective of permanent water influence such as the presence of willow or cottonwood.

- **Ephemeral** (short-lived) – A stream that flows only in direct response to precipitation, and whose channel is above the water table at all times. These streams do not flow continuously for at least 30 days and do not have visible vegetation or physical characteristics reflective of permanent water influence such as a defined stream channel or cottonwoods.

Riparian and wetland areas adjacent to surface waters are the most productive and vital ecosystems in the EDO. Riparian and wetland areas represent less than 1% of the EDO. These regions play an integral role in restoring and maintaining the chemical, physical and biological integrity of water resources. Riparian, and wetland habitats have a greater diversity of plant and animal species than adjoining areas. Healthy

riparian and wetland areas have the potential for multi-canopy vegetation layers with trees, shrubs, grasses, forbs, sedges, and rushes and are valuable habitat for a wide variety of wildlife species. Healthy systems also filter and purify water, reduce sediment loads, enhance soil stability, provide micro-climatic moderation, and contribute to groundwater recharge and base flow. They stabilize water supplies, improved by both floods and droughts. Functioning riparian/wetland areas provide many values; natural fire barriers, recreation, fisheries, wildlife habitat, increased water supply, cultural, historical, and economic.

The Humboldt, Salmon, Owyhee Rivers are the principal drainages in the EDO. Peak flows of these basins and its tributaries occur between mid-April and mid-July as a result of snowmelt and rainfall. Spring and early summer runoff are maybe twenty to fifty times greater than base flow. Base flows are maintained during the remainder of the year by groundwater and spring discharges. The base flow can become more interrupted during drought years as water discharges become more limited in amount. During the summer, high-intensity and widely-dispersed thunderstorms produce sporadic releases of large amounts of precipitation for short durations; however, overland flow and runoff are insufficient to sustain flows for an extended period. The principle drainages of EDO contain a variety of stream types and floodplains, from small spring-fed creeks to reaches of medium and large rivers. Streams and their floodplains occur in a wide range of landscapes, from high elevations to slow-moving meadow reaches, to mid- and lower- elevation fast-flowing basalt canyon reaches. Stream and river conditions vary from the entirely undisturbed river and vegetative communities in inaccessible rocky canyons to deep and erodible soil banks at lower elevations. Other surface waters include shoreline and open water habitat in reservoirs, ponds, and natural springs.

Riparian communities occur along the watercourses of the project area and in association with streams. In the Great Basin, riparian communities are dominated by various mixtures of cottonwood, aspen, and willow species. Although riparian zones account for a tiny portion of the total acreage of the project area, they play a critical role as habitat for wildlife.

Green forage is especially essential for many wildlife species and livestock during the summer and fall, when upland vegetation has dried out. The structure, food, and water provided by these communities make them the most diverse and productive wildlife habitat in the project area. Riparian areas are highly favored by livestock, which has led to disturbance of this habitat type in many areas. Where site potential allows, vegetation may develop multiple canopies, including trees, shrubs, grasses, forbs, sedges, and rushes. This complex vegetation structure is the goal of riparian management, and it can provide exceptional habitat for a wide array of wildlife species.

Riparian areas are essential for fish, amphibians, aquatic mollusks and the aquatic ecosystem. Streamside vegetation provides bank stability and shade to maintain cool temperatures in riparian areas are crucial to fish and the aquatic ecosystem. This vegetation provides cover for fish and amphibian species. Livestock forages on riparian plants and consequently alter plant arrangement as they also wield physical force that could modify stream banks and change the physical features of riparian habitats. Chronic erosion produces slow but continuous sediment deposits over an extended period. Fish population survival and production can decrease to a near remnant level from high persistent sediment input over the long-term (Bisson and Bilby 1982).

Proper Functioning Condition (PFC) is a standardized gauge of whether a riparian system has adequate vegetation, landforms, or large woody debris to perform essential flood control, water quality, erosion control, and habitat functions (BLM 2003). PFC can be reached at a lower level of vegetation development than the management goal of Desired Future Condition. Non-functioning riparian areas are less capable of slowing water velocity, catching sediment, stabilizing stream banks, allowing for infiltration, and recharging groundwater supplies. Reduced vegetative densities could lead to increased surface runoff. Gullies would continue to down cut until they either achieve equilibrium or bedrock is found. Non-functioning riparian areas lose the capability to store water in the soil and yield less water for late summer base flows, increasing the potential for erosion. Most streamflow occurs during the spring in direct response to the melting of the snowpack. Typical streamflow originates at the upper elevations and enters the stream by way of overland flow and shallow groundwater discharge. In drought years there is little to no snowpack to keep water flowing in the hottest months of the year.

The EDO manages over 1,200 miles of stream and more than 8,000 springs. Typical riparian areas include seeps, springs, and streams dominated by willows, cottonwood, alder, aspen, and wetland vegetation such as sedges and rushes. Degraded riparian areas may be governed by species such as Kentucky bluegrass, cheatgrass, thistle, and non-native weedy vegetation. Most springs are small and encompass only a fraction of an acre to a few acres.

PFC assessments were established as part of the Standard and Guidelines for the Northeastern Nevada Resource Advisory Council approved and published in 1997. Standard 2 for Riparian and Wetland sites states: “Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria.”

Between 1998 and 2015, a total of 2,229 springs in the EDO were surveyed. 463 (21%) of the springs were in PFC. In addition, 1,363 (61%) of the lentic sites were functional at risk. Non-functional springs represented 403 (18%) of the sites. Average lentic riparian area of recorded sites (180) is 0.337 acres, with a range of 0.001 acres to 468 acres.

The EDO now has long-term trend data on 134 streams between 1977 and 2017, collected using the Level III Transect Method (BLM 2002). BLM has observed an improving trend in stream condition on many allotments with changes in livestock grazing practices. There is an upward trend on 84 (63%) of the streams, and only 33 (25 %) are showing a downward trend in condition. Stream survey data indicates that 44 (33%) of the streams are in excellent condition; 55 streams (41%) are in fair to good condition, with 35 (63%) of these showing an upward trend in condition. Finally, only 35 (26%) streams are in poor riparian condition. Furthermore, 18 (51%) of those streams show an upward trend in condition.

3.2.10.2. Environmental Effects

Aquatic wildlife species are dependent on stream and riparian habitats. Good riparian and stream habitat conditions benefit most forms of aquatic wildlife. By definition, functional riparian areas and wetlands develop diverse ponding and channel characteristics to provide the habitat and water depth, duration and temperature necessary for fish production, waterfowl breeding and other uses and support greater biodiversity (Prichard et al. 1998). For purposes of this analysis, actions or conditions which benefit

riparian areas and wetlands (as described previously) are inferred to benefit aquatic wildlife including special status species.

Livestock trailing within riparian areas or at stream crossings can have similar impacts to riparian vegetation, and stream channel condition as occurs for livestock grazing, except the duration and magnitude of effects from supervised trailing events are less than what can happen under generally permitted livestock grazing. Livestock trailing in riparian areas and wetlands can alter the structure and function of riparian plant communities by grazing, browsing, and trampling. The quantity and composition of plant species, as well as the quantity and depth of plant roots, can be affected. Livestock can also change the vertical structure and distribution of vegetation, as selective removal or trampling damage can alter age structure of plant communities (Kauffman & Krueger, 1984; Popolizio, et al., 1994). In general, riparian areas and wetlands in a reduced condition, either from recreation, flow alteration, or livestock grazing, are at an increased risk for impacts from livestock trailing activities than riparian areas and wetlands that are functioning properly.

The general effects of livestock trailing on aquatic wildlife include disturbance (i.e., behavioral modification) to individual aquatic species and physical impacts to riparian habitat:

- Disturbance – Livestock and Human Presence

- Physical, Direct – Trampling of individual aquatic animals, eggs, riparian vegetation, increased amounts of sediment entering the stream, reduced bank stability, or essential habitat features (e.g., redds). In the short term, there can be an increase in nutrients and bacteria entering streams.

- Physical, indirect - Trampling and incidental grazing of riparian vegetation leading to reduce bank stability. Long-term shifts in plant communities from more mesic species to species associated with drier conditions can occur if stipulations are not followed.

Indirect impacts to fish could result from the effects of livestock watering and stream crossing on fish habitat. Concerns for salmonids (i.e., LCT or redband trout) include connectivity throughout watersheds, habitat complexity, stream temperature and sediment in streams. Sediment could be introduced into the stream at the stream crossing location or watering sites. Any localized increase in sediment could affect spawning habitat for salmonids species in the area immediately downstream of the crossing site.

Typical direct and indirect short- and long-term effects from ground disturbing activities include compaction and loss of infiltration, increased runoff, accelerated erosion, increased infestations of invasive plants and shifts in plant communities from more mesic species to species associated with drier conditions. Over the long-term, prescriptive management actions (such as a livestock grazing system), can have beneficial direct and indirect effects on riparian areas. Project stipulations can also reduce impacts and/or create positive short- and long-term effects.

The impacts assessment for riparian areas and their associated wetlands due to livestock trailing focused on areas where livestock enter the riparian conservation area (RCA). The potential for impacts to the RCA vary according to the type of riparian stream (as described above), the kind of stream crossing

(bridge, culvert, ford), and the type of road surface used for livestock trailing (paved, gravel, dirt). Perennial and intermittent streams have a defined stream channel and therefore have the potential to influence downstream riparian conditions. Livestock crossing areas for these stream types were considered to have the potential for indirect effects to downstream instream condition and water quality. Ephemeral streams, which do not have a well-defined channel due to their limited surface flows, are expected to have less influence on downstream channel condition than perennial and intermittent stream types.

Stream crossing areas that occur on roads with bridges or culverts would have direct impacts to vegetation (trampling, grazing, browsing) within the road right-of-way with minimal additional effects on the stream channel because the channel conditions are already altered by the constructed road crossing. Livestock crossings that occur at existing designated crossings or water gaps would have direct impacts to riparian vegetation (trampling, grazing, browsing) and stream channel conditions (trampling) with indirect effects on the stream channel extending for an uncertain distance below the designated crossing or water gap. Impacts from livestock trailing through these areas would not likely be measurable because they are currently used as crossing or watering areas by permitted livestock within the specific allotment. Livestock crossings that occur at a stream ford would have direct impacts to riparian vegetation and stream channel condition at the crossing areas.

Livestock trailing activities that occur within a RCA have the potential to introduce fine sediment into streams. The amount of sediment generated is influenced by the type of road surface used for livestock trailing. Roads that are paved are expected to have the least potential to generate sediment that could enter a stream. Roads that have a gravel surface with constructed drainage would have an increased potential to introduce fine sediment into streams. Roads that have a dirt surface with no scheduled maintenance or constructed drainage would have the greatest potential for the erosion of surface particles that could enter a stream. The use of active herding combined with the requirement to have all livestock removed from the RCA after livestock trailing events would limit impacts to riparian areas and wetlands to levels that are localized and short-term in duration.

Livestock trailing activities have the potential to affect wetlands which are not associated with riparian areas. Livestock trailing activities are to avoid wetland areas as livestock are moved along the trailing routes. The stipulations are expected to minimize impacts to wetlands to the extent possible, but all impacts to wetlands may not be prevented because not all of the wetlands are fenced to exclude livestock.

Alternative 1- No Crossing Permits Authorized

In Alternative 1, crossing permits would not be issued for moving livestock across BLM-administered lands but allow for livestock trailing on non-BLM roads, publically maintained roads; State managed properties, or on private lands. Some riparian areas and wetlands would likely benefit from eliminating impacts due to livestock trailing across BLM-administered lands, but these benefits would be localized and may or may not be measurable.

Alternative 2- No Action Alternative
Impacts to aquatic species from livestock trailing would continue as they are currently permitted under the Alternative 2. Fisheries and riparian stipulations would not be applied to livestock trailing or crossing. Impacts to aquatic species and riparian habitats from livestock trailing/crossing, associated vehicle use, and prolonged concentration at bedding and watering sites on BLM lands would continue to occur. Increased sedimentation from livestock fording, increased stream temperature from loss of riparian canopy cover due to livestock trampling or grazing, and increased runoff into streams due to inevitable riparian herbaceous utilization are all likely to still occur. Seasonal distance and timing restrictions for aquatic species or special status would not be implemented and thus breeding behaviors could be disrupted by livestock trailing or crossing activities. Aquatic species occupying BLM lands may still be further disturbed by trailing movements on adjacent non-BLM lands. These actions would vary in magnitude over space and time during trailing since the diurnal movement of livestock would be relatively rapid, whereas overnighting livestock near riparian habitats would increase the magnitude and duration of some direct and indirect impacts.

Alternative 3- Proposed Action
Under the Proposed Action, impacts to special status fish in streams crossed by livestock trailing events are expected to be minimal: stipulations would include bedding and overnighting restrictions to avoid or minimize trampling and trailing effects within riparian zones. Through stipulations the extent of impacts to streambanks would be less under the Proposed Action than Alternative 2. Aquatic species and riparian habitats occupying BLM lands may still be further disturbed by trailing or different management activities on adjacent non-BLM lands.

When livestock cross streams on existing roads with bridges or culverts, the likelihood of direct impacts occurring to adult or juvenile fish is further reduced as most livestock would likely utilize the bridge or culvert to cross. Some livestock may stray from the culvert or bridge and pass through the stream, but the numbers would probably be small. The pre-determined locations will be checked to minimize impacts to fish nest, stream channels, and streambanks. Wherever possible, applied-for livestock trails would be relocated away from stream crossings to bridges and culvert crossings, reducing effects. In locations where livestock cross streams on existing roads, the direct and indirect impacts would likely be less than measurable as road surfaces are devoid of vegetation.

Streambank alteration through mechanical hoof impacts at crossing sites on these streams would occur under Alternative 3, but it would be limited to designated crossing areas. Stipulations included in crossing permits would minimize impacts to special status fish species. Livestock bedding would not be authorized within riparian areas. The active herding of livestock across streams and through the riparian area is expected to limit time and minimize impacts.

Issuing livestock crossing permits with stipulations is expected to minimize impacts to riparian areas and wetlands to levels that are below what has historically occurred. The requirement for livestock bedding/over-night areas and temporary water facilities to be at least 1 mile from riparian areas, and restricting livestock trailing across riparian areas and wetlands to pre-determined locations would reduce the amount of time livestock are present in the RCA and should improve the riparian condition in some places. The use of active herding and the requirement for all livestock to be removed from the RCA after

crossing events are expected to minimize the impacts to riparian areas and wetlands within the proposed livestock trailing corridors. Trailing stream crossings would have negligible additional impacts to riparian habitat, water quality, and fisheries over the short and long term.

Cumulative Effects of the Alternatives

The baseline conditions for riparian areas are described in the Affected Environment above. The relationship between aquatic species, riparian condition, and water quality are interrelated, actions that affect one of these resources are likely to affect the other aquatic resources.

The PPRFFAs that effect aquatic special status species and riparian habitats include LCT reintroduction, livestock grazing, lands and minerals actions, wildland fire and OHV use (recreation).

Permitted livestock grazing occurs throughout the area. Livestock have stream access in most allotments except for where an exclosure system was developed. Livestock effects on riparian habitat varies by season. OHV activity, primarily associated with unimproved roads, can remove vegetation at and near stream crossings allowing minor to moderate increases in sediment input and negligible increases in water temperature downstream of crossings. Past wildfires have resulted in a short-term (two year) loss of vegetation that shades a stream and stabilizes streambanks. Increased sediment input from adjacent uplands and increased water temperatures can degrade water quality over the short term until riparian vegetation becomes reestablished. Aquatic species and riparian habitats occupying BLM lands may still be further disturbed by trailing or different management activities on adjacent non-BLM lands. The 1995 LCT Recovery Plan identified potential LCT reintroduction streams (Coffin and Cowan 1995). Stream conditions and habitat must meet standards to support trout population before reintroductions can occur.

Alternative 1

Alternative 1, combined with PPRFFAs would result in fewer impacts to riparian areas, and wetlands, as trailing and crossing, would not be authorized cross country. The use of existing improved water crossings would reduce or eliminate impacts from unimproved stream crossings. Overall, there would be a reduction in cumulative effects to riparian areas and aquatic species due to livestock trailing for Alternative 1 and trailing activities confined to public roads.

Alternative 2

Alternative 2, combined with PPRFFAs would result in more cumulative impacts to riparian areas than would be expected for Alternatives 1 or 3. Overall, there would be an increase in cumulative effects to riparian areas and wetlands due to livestock crossing or trailing.

Alternative 3

Proposed Action alternative (Alternative 3), combined with PPRFFAs would result in more cumulative impacts to riparian areas and wetlands than would be expected for the Alternative 1, but less than Alternative 2. The stipulations that would be applied to livestock trailing permits would reduce the potential for cumulative impacts below levels that are of concern. The trailing would represent one to two hours of use for crossings by livestock; whereas, small herds of livestock would be accessing streams daily throughout the authorized grazing periods. Of the total 1,200 miles of streams in the analysis area,

with the potential for mostly stream impacts associated with fording locations could have some or negligible cumulative effects on riparian habitat, water quality, and fisheries.

3.2.11. Wildlife (Terrestrial)

3.2.11.1. Affected Environment

Sagebrush-steppe is the dominant habitat type within the EDO. Typical sagebrush-associated and upland species include Greater sage-grouse, pronghorn antelope, mule deer, coyote, pygmy rabbit, black-tailed jackrabbit, Townsend's ground squirrel, Brewer's sparrow, western meadowlark, and horned lark. Common riparian species include various waterfowl, yellow warbler, red-winged blackbird, song sparrow, spotted towhee, and lazuli bunting. Most of the songbirds are neo-tropical migrants, which means that they are only present in the EDO during the spring, summer, and fall. Vegetation communities vary depending on elevation, aspect, fire history, moisture regime and other factors.

The Nevada Department of Wildlife's (NDOW) Wildlife Action Plan (WAP 2012) identified 22 Key Habitats and associated Species of Conservation Priority. These key habitat types are used as the basis of analysis for non-avian species in this document. The Wildlife Action Plan can be found at http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Wildlife_Action_Plan/. In addition, the Great Basin Bird Observatory published a Nevada Comprehensive Bird Conservation Plan (2010) specifically directed at conservation of birds and their habitats within Nevada. This plan is used as the basis for analysis for birds, and can be found here: https://www.gbbo.org/bird-conservation-plan.

3.2.11.1.1. General Wildlife

3.2.11.1.1.1. Big Game

The NDOW manages big game species by Management Areas, which consist of one, or more commonly, several Hunt Units. The EDO contains all of Management Areas 08 and 09 (which consist of a single Hunt Unit each), significant portions of Management Areas 06, 07 and 10, and smaller portions of Areas 05, 11, 12, 14 and 15 (Map 4). Big game hunting is a predominant form of recreation within the EDO.

Mule Deer

Mule deer (*Odocoileus hemionus*) occur in a diversity of habitat types throughout Nevada but occur in highest densities in montane shrub-dominated communities. They are often associated with successional vegetation. They are often found on open south-facing slopes in winter. Mule deer browse on a wide variety of woody plants and graze on grasses and forbs. Throughout the year, most activity occurs at dawn and dusk, though nocturnal and daytime activity is common. Mule deer are a secondary successional species, taking advantage of plant species that are often the result of some type of disturbance. They have a high degree of selectivity, not only for the plant species they choose to eat, but also for the specific parts of the plant and the time of year that a particular plant may be eaten. Browse species include sagebrush, bitterbrush, serviceberry, snowbrush, and snowberry. When deer are feeding on browse, they prefer the tenderest parts, the new shoots and tips or leaders. Leaders are the most nutritious, most easily bitten off, most flavorful, and most easily digested part of the browse.

Nevada's mule deer populations have been stable to declining the past several years. The 2017 statewide population is estimated to be about 92,000 mule deer, slightly lower than the estimated 94,000 in 2016

(NDOW 2017). During the past four years, much of Nevada has experienced severe to extreme drought conditions, which has directly impacted mule deer populations across the state.

Within the EDO, mule deer populations have been negatively impacted by the aforementioned drought, loss and degradation of transitional and winter habitat due to wildfire, mining (especially Management Area 06 in the Carlin Trend) and plant senescence on winter range. Average to above average snowpack and associated deep soil moisture during 2016 and 2017 should help to improve habitat conditions for mule deer. Mule deer herds within the EDO occupy distinct seasonal ranges (generally higher elevation mountain brush habitats in summer, lower elevation shrub communities in winter) and undertake variable degrees of migration, depending on the juxtaposition of seasonal ranges, annual weather vagaries and traditional migration patterns (Map 5).

Pronghorn

The 2017 statewide population estimate for pronghorn (*Antilocapra americana*) is 29,000 which is unchanged from the 2016 estimate. Pronghorn have generally benefitted from recent wildfires as long as the burned habitats have not converted to annual grasslands.

Within the EDO, pronghorn populations have continued to prosper in recent years, in some areas occupying all available summer habitat. Negative impacts to winter shrub habitats have resulted from recent wildfires, although in general these fires have been an overall benefit to pronghorn. Pronghorn herds occupy distinct seasonal ranges within the EDO and undertake variable degrees of migration, depending on the juxtaposition of seasonal ranges, weather and traditional migration patterns (Map 6).

Rocky Mountain Elk

Statewide, the 2017 population estimate is 15,000 elk (*Cervus elaphus*), representing a 6% decline from 2016. Many of the elk herds within the EDO are exceeding population objectives and liberal hunting quotas have been instituted in recent years as a tool to help bring population numbers in line with objectives. Robust calf ratios indicate the statewide elk population will be productive in 2017 and beyond and above average moisture receipts in winter 2016-2017 are likely to improve quantity and quality of forage availability for elk.

Most elk herds within the EDO undertake seasonal migrations between habitats, although this species has significantly more year-round range than sympatric mule deer or pronghorn herds (Map 7).

Bighorn Sheep (Discussed here, only listed under Special Status Species)

Bighorn sheep occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons (Shackleton et al. 1999, Krausman et al. 1999). Escape terrain (cliffs, talus slopes, etc.) is an important feature. Dense forests and chaparral that restrict vision are avoided (Shackleton et al. 1999, Krausman et al. 1999).

The EDO contains both Rocky Mountain (*Ovis canadensis canadensis*) and California (*O.c. californiana*) bighorn sheep subspecies. Once the most widespread big game animal in Nevada, bighorn sheep are now significantly reduced in distribution and abundance owing to several factors, foremost being the transmission of novel bacterial pathogens from domestic sheep and goats to naïve bighorn populations.

Disease events are typically episodic in nature and generally result in all-age mortality, severe reductions population size, and low to no lamb recruitment in subsequent years.

Six bighorn herds occur within the EDO, consisting of two California (Snowstorms and Sheep Creeks) and five Rocky Mountain (Badlands, Pilot Range/Leppy Hills, East Humboldts and Rubies) herds (Map 8). The Rubies and East Humboldts herds occur almost exclusively on Forest Service and private land, while the remainder primarily occupy BLM land. A total of 383,394 acres of occupied bighorn habitat, 216,032 acres of that on BLM land, occurs within the BLM EDO.

The following descriptions of status and trend of the EDO's bighorn herds are adapted from the NDOW's 2016-2017 Big Game Status Book (NDOW 2017):

East Humboldts - The East Humboldts herd experienced an all-age catastrophic pneumonic disease event in the winter of 2009-2010. Monitoring suggests mortality rates attributable to the pneumonia outbreak were nearly 95% across all age classes. This was the first measureable disease event since the sheep were released in 1992, including the 1995-96 winter when the adjacent bighorn population in the Ruby Mountains experienced considerable loss from a similar pneumonic die-off. The herd had been showing a strong growth trend from the original 31 animals released in 1992 to an estimated 180 animals in the fall 2009. In 2012, 15 sheep remained in this herd, consisting of 4 rams, 10 ewes and 1 lamb. In order to set the stage for a reintroduction into the area and as part of an experiment to evaluate possible disease transmission from existing mountain goats back to bighorn sheep, the NDOW removed the remaining 15 bighorns.

In 2013, the NDOW reintroduced 20 sheep from Alberta, Canada. The compliment of sheep included 17 pregnant ewes, and 3 rams. From 2013 to fall of 2016, the sheep herd grew to approximately 42 animals. Unfortunately during late-fall and early winter of 2015, the sheep again succumbed to a pneumonic disease event involving a new disease "spillover" of *Mycoplasma ovipneumoniae* likely transmitted from the sympatric mountain goat herd. Since that time, the herd has stabilized around 20 animals. Winter 2017 observations of lamb recruitment were positive with a lamb ratio of 29:100 ewes. Time will tell if this herd can maintain consistent annual lamb recruitment with the herd exposed to *M. ovi* Risk of disease transmission continues to exist with domestic sheep and goat farm flocks on private lands surrounding the mountain and checkerboard high-elevation private parcels on the mountain.

Rubies - In the winter of 2009-2010, a pneumonia epidemic struck this herd resulting in an estimated 90% mortality. Between 2013 and 2015, the sheep herd remained stable to declining and lamb recruitment varied from low to maintenance levels. However, since 2015, this herd has shown incredible lamb recruitment (>80 lambs: 100 ewes). In January 2017, 27 total sheep were observed consisting of 7 rams, 11 ewes, and 9 lambs resulting in observed ratios of 64 rams: 100 ewes: 82 lambs. Of the 7 rams observed, two were mature and the others were young rams (less than 3 years of age). The current population estimate for this herd is 30 adult animals.

Snowstorms - Due to the August 2011 all-age bacterial pneumonia die-off, the season was closed to ram harvest between 2012 and 2014. The year 2016 marked another year of low recruitment with 3 yearling California bighorn observed in May 2016 (1 yearling ewe and 2 yearling rams). As of spring 2017 there were 17 ewes, 5 lambs and approximately 15 rams occupying the Snowstorms.

Range conditions remain fair in the peripheral low elevations surrounding the Snowstorms. A combination of drought, livestock utilization and an overabundance of wild horses have contributed to degraded habitats, particularly riparian habitats on the west side of the Snowstorm Range. Due to the resiliency of the mid to upper elevations of the Snowstorm Range, much of the year-round habitat remains in good to excellent condition. However, in July, 2017, 3,675 acres of designated year-round habitat burned within the Little Humboldt WSA at the extreme western periphery of the Snowstorm Fire.

Sheep Creeks - In March 2017, 94 California bighorn were observed during aerial composition surveys; yielding ratios of 67 rams: 100 ewes: 29 lambs. Since 2012, the NDOW has made an effort to actively manage this herd through relocation efforts and ewe harvest in an attempt to maintain the population within sustainable management levels based on the current condition of habitat resources. This herd primarily inhabits an area that also serves as winter range for several hundred deer, antelope and elk, as well as supporting several thousand livestock AUMs.

In July, 2017 47% (35,335 acres) of year-round habitat burned in the Rooster's Comb Fire. Furthermore, this habitat was disproportionately important to the herd. The NDOW has indicated that it may be necessary to relocate a portion of the Sheep Creek herd due to a loss of habitat integrity.

Badlands - This herd experienced an all age die-off during the fall 2014. Necropsies found bighorn to be suffering from severe chronic pneumonia. It is believed the disease event has subsided, but lamb recruitment will likely remain low for at least the short-term. Bighorn will continue to be monitored for lamb recruitment. A predator control project aimed at mountain lion removal is ongoing in this area. Three male lions have been removed since the initiation of the project. One collared ewe appeared to have died from lion predation in mid-October 2016.

An aerial survey was conducted in October 2016 and 18 bighorn were classified as 3 rams, 11 ewes, and 4 lambs. Two rams and 2 ewes observed were yearlings indicating lamb survival the previous year.

Pilot Range/Leppy Hills – This herd straddles the Nevada/Utah border. In 2010, the presence of bacterial pneumonia was documented in the population. The disease event severely impacted lamb survival. An aerial composition survey was conducted by Utah Division of Wildlife Resources in August 2016 with 24 bighorn classified as 10 rams, 13 ewes, and 1 lamb. The only lamb observed on the survey appeared to be in poor health. There are believed to be approximately 30 bighorn currently in the population. The short-term outlook for this herd is poor. Lambs are being born, but few if any are being recruited into the population.

The construction of an artificial water development was recently completed on the mid-elevation slopes of Pilot Peak. The placement of the unit at mid slope as opposed to the lower elevation benches is intended to reduce the probability of bighorn sheep coming into contact with domestic sheep that use the valley. The bighorn seem to be reacting favorably to this newly available water. There are active domestic sheep allotments and trailing routes on the east side of Pilot Peak and in the adjacent Leppy Hills, thus the risk of disease transmission remains high.

Effective Separation, defined as "spatial or temporal separation between wild sheep and domestic sheep or goats, resulting in minimal risk of contact and subsequent transmission of respiratory disease between animal groups" (WSWG 2012), is the BLM's policy when authorizing domestic sheep use on BLM lands. Currently, physical separation of domestic sheep and goats from wild sheep is the only effective means to reduce the potential for pneumonia-type disease transmission. Domestic sheep and goat authorizations and other uses will be implemented to ensure that effective separation results in a high degree of confidence that there will be a low to no risk of contact with wild sheep (BLM 2016).

3.2.11.1.1.2. Other General Wildlife

Approximately 350 species of terrestrial vertebrates occur in northeastern Nevada (Appendix B), including representatives of all major taxa: mammal, bird, reptile and amphibian. A host of invertebrate and aquatic wildlife species also occur in appropriate habitats. Many of these species may inhabit the EDO on a seasonal basis while others are year-long residents. Approximately 100 birds, 70 mammals, and several reptile, amphibian and invertebrate species are found in sagebrush-steppe, the dominant habitat type throughout the EDO.

3.2.11.1.2. Special Status Species

See Section 3.2.10.1.1 Aquatic Special Status Species for discussion on what Special Status Species are and requirements BLM Sensitive Species. Terrestrial sensitive species known or with the potential to exist within the EDO are listed in Table 9 below.

Table 9. EDO BLM Terrestrial Special Status Species

Scientific Name	Common Name	Status
Birds		
Accipiter gentilis	northern goshawk	BLM Sensitive
Antigone canadensis	Sandhill crane	BLM Sensitive
Aquila chrysaetos	golden eagle	BLM Sensitive
Asio flammeus	short-eared owl	BLM Sensitive
Athene cunicularia hypugaea	western burrowing owl	BLM Sensitive
Buteo regalis	ferruginous hawk	BLM Sensitive
Buteo swainsoni	Swainson's hawk	BLM Sensitive
Centrocercus urophasianus	greater sage-grouse	BLM Sensitive
Charadrius alexandrinus nivosus	western snowy plover	BLM Sensitive
Empidonax traillii adastus	Great Basin willow flycatcher	BLM Sensitive
Falco peregrinus	peregrine falcon	BLM Sensitive
Gymnorhinus cyanocephalus	pinyon jay	BLM Sensitive
Haliaeetus leucocephalus	bald eagle	BLM Sensitive
Lanius ludovicianus	loggerhead shrike	BLM Sensitive
Leucosticte atrata	black rosy-finch	BLM Sensitive
Leucosticte tephrocotis	gray-crowned rosy-finch	BLM Sensitive
Melanerpes lewis	Lewis's woodpecker	BLM Sensitive
Numenius americanus	long-billed curlew	BLM Sensitive
Oreortyx pictus	mountain quail	BLM Sensitive
Oreoscoptes montanus	sage thrasher	BLM Sensitive
Psiloscops flammeolus	flammulated owl	BLM Sensitive
Spizella breweri	Brewer's sparrow	BLM Sensitive

Scientific Name	Common Name	Status
Tympanuchus phasianellus	Columbian sharp-tailed grouse	BLM Sensitive
Mammals		
Antrozous pallidus	pallid bat	BLM Sensitive
Brachylagus idahoensis	pygmy rabbit	BLM Sensitive
Corynorhinus townsendii	Townsend's big-eared bat	BLM Sensitive
Eptesicus fuscus	big brown bat	BLM Sensitive
Euderma maculatum	spotted bat	BLM Sensitive
Lasionycteris noctivagans	silver-haired bat	BLM Sensitive
Lasiurus cinereus	hoary bat	BLM Sensitive
Lasiurus blossevillii	western red bat	BLM Sensitive
Lontra canadensis	northern river otter	BLM Sensitive
Microdipodops megacephalus	dark kangaroo mouse	BLM Sensitive
Myotis californicus	California myotis	BLM Sensitive
Myotis ciliolabrum	western small-footed myotis	BLM Sensitive
Myotis evotis	long-eared myotis	BLM Sensitive
Myotis lucifugus	little brown bat	BLM Sensitive
Myotis thysanodes	fringed myotis	BLM Sensitive
Myotis volans	long-legged myotis	BLM Sensitive
Myotis yumanensis	Yuma myotis	BLM Sensitive
Ovis canadensis	bighorn sheep	BLM Sensitive
Parastrellus hesperus	canyon bat	BLM Sensitive
Tadarida brasiliensis	Brazilian free-tailed bat	BLM Sensitive
Sorex merriami	Merriam’s shrew	BLM Sensitive
Sorex palustris	American water shrew	BLM Sensitive
Sorex preblei	Preble's shrew	BLM Sensitive
Sorex tenellus	Inyo shrew	BLM Sensitive
Reptiles		
Charina bottae	northern rubber boa	BLM Sensitive
Crotaphytus bicinctores	Great Basin collared lizard	BLM Sensitive
Gambelia wislizenii	long-nosed leopard lizard	BLM Sensitive
Phrynosoma hernandesi	greater short-horned lizard	BLM Sensitive
Phrynosoma platyrhinos	desert horned lizard	BLM Sensitive
Invertebrates		
Danaus plexippus	monarch butterfly	BLM Sensitive
Euphilotes pallescens mattonii	Mattoni's blue	BLM Sensitive
Limenitis archippus lahontani	Nevada viceroy	BLM Sensitive
Oreohelix laisae	Goshute Mountain snail	BLM Sensitive
Plants		
Antennaria arcuata	meadow pussytoes	BLM Sensitive
Astragalus calycosus monophyllidus	one-leaflet Torrey milkvetch	BLM Sensitive
Atragalus anserinus	Goose Creek milkvetch	BLM Sensitive
Boechera falcifructa	Elko rockcress	BLM Sensitive
Collomia renacta	Barren Valley collomia	BLM Sensitive
Erigeron latus	broad fleabane	BLM Sensitive
Eriogonum rosense beatleyae	Beatley buckwheat	BLM Sensitive
Eriogonum lewisii	Lewis buckwheat	BLM Sensitive
Eriogonum nutans var. *glabratum*	Deeth buckwheat	BLM Sensitive

Scientific Name	Common Name	Status
Ivesia rhypara	grimy mousetails	BLM Sensitive
Lathyrus grimesii	Grimes vetchling	BLM Sensitive
Lepidium davisii	Davis peppergrass	BLM Sensitive
Leptodactylon glabrum	Owyhee prickly phlox	BLM Sensitive
Mentzelia tiehmii	Tiehm blazingstar	BLM Sensitive
Penstemon idahoensis	Idaho beardtongue	BLM Sensitive
Phacelia minutissima	least phacelia	BLM Sensitive
Pinus albicaulis	whitebark pine	BLM Sensitive
Potentilla cottamii	Cottam cinquefoil	BLM Sensitive
Ranunculus triternatus	obscure buttercup	BLM Sensitive
Silene nachlingerae	Nachlinger catchfly	BLM Sensitive
Viola lithion	rock violet	BLM Sensitive

3.2.11.1.2.1. Sensitive Birds

Greater Sage-Grouse (GRSG)

GRSG is a sagebrush-obligate species, requiring sagebrush habitat for both food and/or cover during all life stages. GRSG begin breeding at leks, or strutting grounds, in early spring and exhibit a polygynous mating system where a small percentage of the males do the majority of breeding. Males defend territories within a lek and perform elaborate courtship displays with specialized plumage and vocalizations. Lek locations can vary, but are typically found in open areas adjacent to sagebrush communities that provide escape, thermal, and feeding cover. Areas of bare soil, short grasses, windswept ridges, exposed knolls and other open areas often serve as leks (Connelly et al. 2004). Approximately 79% of sage-grouse nesting occurs within four miles of leks (Doherty et al. 2010). During the nesting season, hens rely on sagebrush with a robust native herbaceous understory for nesting cover and food. In summer, when herbaceous vegetation begins to desiccate in sagebrush uplands, broods typically shift habitat use to more mesic areas containing an abundance of insects, also taking advantage of vegetation phenology to feed on more succulent forbs (Connelly et al. 2004, Klebenow 1969). During the winter, sage-grouse require extensive sagebrush that protrudes above the snow for both food and cover.

On September 21, 2015, BLM finalized the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA; BLM 2015). The Record of Decision amended Resource Management Plans for BLM offices containing GRSG habitat in response to the 2010 U.S. Fish and Wildlife Service (USFWS) finding that the GRSG was “warranted but precluded” from listing under the Endangered Species Act. The USFWS identified the inadequacy of existing regulatory mechanisms as a primary threat to the species, including the principal regulatory mechanisms for the BLM as conservation measures incorporated into land use plans. Therefore, the purpose of the ARMPA is to identify and incorporate appropriate measures in existing land use plans. It is intended to conserve, enhance and restore GRSG habitat by avoiding, minimizing, or compensating for unavoidable impacts on GRSG habitat in the context of the BLM’s multiple-use and sustained yield mission.

GRSG habitat within the ARMPA planning area falls into three management categories: priority habitat management areas (PHMA), general habitat management areas (GHMA) and other habitat management areas (OHMA). These management areas are defined as follows:

- PHMA - BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as priority areas for conservation in the USFWS's Conservation Objectives Team (COT) report (USFWS 2013). These areas include breeding, late brood-rearing, and winter concentration areas and migration or connectivity corridors.

- GHMA - BLM-administered lands where some special management will apply to sustain GRSG populations; these are areas of occupied seasonal or year-round habitat outside of PHMA.

- OHMA - BLM-administered lands identified as unmapped habitat in the Draft Land Use Plan Amendment (LUPA)/EIS that are within the planning area and contain seasonal or connectivity habitat areas. With the generation of updated modeling data (Coates et al. 2014,) the areas containing characteristics of unmapped habitat were identified and are now referred to as OHMAs.

The ARMPA also identifies specific sagebrush focal areas (SFA), a subset of PHMA (see ARMPA Figure 1-3) derived from GRSG stronghold areas described by the USFWS in a memorandum to the BLM titled Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes (USFWS 2014). The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.

The BLM EDO contains 3,582,761 acres of PHMA, 1,202,765 acres of GHMA, and 1,151,938 acres of OHMA. These figures include 1,610,776 acres of SFA and only include habitats on BLM-administered lands (Map 9). All seasonal habitat types are represented (Lekking habitat: March 1-May 15, Nesting habitat: April 1-June 30, brood-rearing habitat [early]: May 15-June 15, brood-rearing/riparian habitat [late]: June 15-September 15 and winter habitat: November 1- February 28) (Map 10). Several of these seasonal habitats may overlap, highlighting the importance of these areas to sage-grouse.

Columbian sharp-tailed grouse

The Columbian sharp-tailed grouse (CSTG) is one of six extant subspecies of sharp-tailed grouse. It is endemic to big sagebrush, shrub-steppe, mountain shrub, and riparian shrub plant communities of western North America. Columbian sharp-tailed grouse were once widespread and abundant in mesic shrub-steppe and grasslands throughout the northwest (Marks and Marks 1988). The subspecies currently occupies less than 10 percent of its historic range, with only three metapopulations remaining in central British Columbia, southeastern Idaho and northern Utah, and northwestern Colorado and south-central Wyoming (Hoffman and Thomas 2007). The subspecies is believed to have disappeared from Montana within this century, and has long (>50 years) been extirpated from California, Nevada, and Oregon (Hoffman and Thomas 2007).

The Columbian sharp-tailed grouse was extirpated from Nevada by 1952. In 1999, a trap and transplant program was initiated in Nevada to reintroduce birds into their former range. Between 1999 and 2005, 226 birds (146 males and 80 females) were transplanted from southern Idaho to the east side of the Snake Mountains in Elko County. This effort is believed to have failed due to predation by common ravens and habitat loss due to wildfire within the area. In 2013, another reintroduction effort was initiated in the Independence Mountains in north-central Elko County. As of spring 2017, a total of 212 CSTG have been released and at least two leks have been established as a result of this translocation project (NDOW 2017a). However, the ultimate success of this effort is still unclear due to high mortality rates of translocated CSTG and low recruitment into the breeding population.

Year-round habitat occurs throughout sagebrush-steppe and intermountain mixed shrub-grass communities. Common shrub cover includes sagebrush, bitterbrush, serviceberry, chokecherry, snowberry, and willow riparian areas. Leks are found on relatively flat, sparsely vegetated knolls, ridge-tops, recent burns, forest clearcuts, natural openings, and other areas with good visibility and good acoustics. Active leks have been located in areas with 100% snow cover. Nesting habitat is characterized by relatively tall, dense shrubs with dense, diverse grass and forb understory. Brood habitat typically includes a high diversity of shrubs, 20 to 40 percent cover, and 60 to 80 percent cover of perennial forbs and bunchgrasses. Selection of winter habitat depends primarily on snow conditions and usually consists of deciduous riparian shrubs and trees (NDOW 2017b).

The persistence of CSTG in Nevada is uncertain at present. The recently reintroduced population occurs in habitat sympatrically occupied by sage-grouse, therefore the analysis for sage-grouse will serve as a surrogate analysis for this vulnerable population of Columbian sharp-tailed grouse.

Mountain quail

Mountain quail are patchily distributed in montane areas of western Nevada. The species is known to be native to the Carson Range, but scattered populations have been reported, including in western and northern Elko County (GBBO 2010). Several of Nevada's fragmented populations were likely extirpated by the 1940s and declines have apparently continued since that time. The statewide population estimate is 800-1,000 (WAP 2012).

Mountain quail are not closely tied to any particular habitat type, but instead are strongly associated with dense montane shrub and forb cover. Steep landscapes, where intact coniferous forests, deciduous woodlands, and montane shrublands exist in close proximity to a stream probably represent ideal conditions (Reese *et al*. 2005). Degradation of streamside habitat due to chronic livestock grazing is a known threat to the species. The role of fire in mountain quail management is complicated; fire may be beneficial by maintaining a landscape mosaic of different seral stages, but large, intense fires may also threaten the persistence of isolated populations (GBBO 2010).

Loggerhead Shrike

Loggerhead shrike inhabits desert scrub, sagebrush rangelands, grasslands and meadows (WAP 2012). Shrikes often perch on poles, wires, or fence posts; hunting perches are an important part of suitable habitat. Arthropods, amphibians, small to medium-sized reptiles, small mammals and birds are primary prey (Reuven 1996). Typical nest sites include shrubs or small trees, with nest height averaging 0.8-1.3 meters (2.6-4.3 feet) off the ground (Wiggins 2005). This species is a fairly common inhabitant in appropriate habitat types within the EDO.

Black Rosy-Finch

Black rosy-finches (*Leucosticte atrata*) breed in remote alpine habitats, descending to lower elevations to winter. Winter foraging and roosting often occurs alongside the gray-crowned rosy-finch (*Leucosticte tephrocotis*) in mixed flocks of 25 – 1,000 individuals. Overall trends and population size in Nevada are unknown, while breeding populations are small and discontinuous (GBBO 2010). Most of the conservation attention for this bird is focused on protecting communal winter roost sites (which are critical for survival) and winter foraging areas.

Winter telemetry studies in northeastern Nevada revealed that black rosy-finches depend heavily upon the shelter offered by below-ground communal roost sites, including abandoned mine shafts, caves, and deep fissures in metamorphic rock outcrops. The flocks return to these roost sites every evening after foraging in sagebrush or montane shrubland habitat up to 10 km [6 mi] away. Flocks may remain in the roosts for extended periods during inclement weather. Known roost sites were located at elevations ranging from 1,400 – 2,800 m [4,600 – 9,200 ft.] within a matrix of sagebrush, montane shrubland, and pinyon-juniper habitats. Roost sites were typically higher in elevation than associated foraging sites.

Pinyon Jay

The pinyon jay is found in pinyon-juniper woodland and less frequently in pine; in the nonbreeding season, it also inhabits scrub oak and sagebrush. Pinyon jays may wander widely in search of food during the nonbreeding season. Jays eat primarily pinyon seeds, but may forage on other seeds and arthropods found in sagebrush habitats. A Great Basin Bird Observatory radio-telemetry study found that foraging pinyon jays appeared to favor transitional areas where pinyon-juniper woodland is interspersed with sagebrush. During the daytime, jays were usually found within 800m [2,600 ft.] of woodland edge, and always within two km [1.2 mi] of the edge. During roosting and nesting, jays travelled deeper (but usually no more than three km [1.8 mi]) into the woodland interior to denser stands. Jays were nearly always found in areas with diverse woodland canopy closure and age structure; they were not observed in large contiguous areas of mature, dense woodland (WAP 2012).

Lewis's woodpecker

In Nevada, this species generally occurs within riparian corridors with aspen or montane riparian habitat. As a weak excavator, the Lewis's woodpecker is more dependent on dead trees than other woodpeckers. Key habitat factors include the presence of large, partly-decayed snags, an open forest structure for aerial foraging, and a well-developed shrub or native herbaceous layer that promotes healthy populations of flying insects (Abele et al. 2004 *in* GBBO 2010). Annual variation in Lewis's woodpecker numbers and

their very patchy breeding distribution within the state make it hard to characterize current trends in Nevada, but the species is a conservation concern because of historic range-wide declines and Nevada's moderately high global stewardship responsibility (GBBO 2010).

Sage Thrasher

The sage thrasher is a sagebrush-obligate species. Nevada contains about one-fifth of the global population of sage thrasher (GBBO 2010). Sage thrashers are consistently more numerous in areas with greater cover of high-quality sagebrush, and they are often positively associated with greater shrub height and vertical complexity. They avoid areas containing juniper regardless of density. Breeding Bird Survey results indicate possible declines in the state dating from approximately 1980 (Sauer et al. 2008 *in* GBBO 2010).

Brewer's Sparrow

Brewer's sparrow is most abundant in relatively large sagebrush patches, both in valley floors and montane sagebrush settings, and is negatively affected by the widespread loss and degradation of high-quality sagebrush habitat (GBBO 2010). While perennial grasses are a valuable component of occupied habitat, this species forages mostly in shrubs (>75% of over 600 observation periods) and relatively little on open ground between shrubs or at base of bunchgrasses (Wiens et al. 1987). Brewer's sparrow populations have declined by ~2% per year in recent years (GBBO 2010).

Western snowy plover

Breeding habitat within Nevada consists of barren shorelines of alkaline playa lakes. During drought the western snowy plover relies heavily on artesian wells and springs near dry playas and generally nests on recently exposed alkaline flats. The snowy plover forages on insects, small crustaceans and other minute invertebrates. This species may breed in appropriate playa habitat within the EDO.

Gray-crowned rosy-finch

Inhabits barren, rocky or grassy areas and cliffs among glaciers or beyond timberline; in migration and winter also in open situations including fields, cultivated lands, brushy areas, and around human habitation (AOU 1983). Nests usually in rock crevices or holes in cliffs. Forages on the ground for seeds. In the spring gleans wind-transported insects from the snow. Later in the season may glean insects from vegetation or may chase flying insects and catch them in the air (WAP 2012). Not known to breed within the EDO but does winter extensively, often forming mixed flocks with black rosy-finches in open habitats. May use abandoned mine shafts as winter roost sites.

Great Basin willow flycatcher

Found throughout the Great Basin, it is restricted to riparian areas of high structural complexity in soils that remain saturated through most of the breeding season (WAP 2012). Willows are the traditionally preferred vegetation (Sogge *et al*. 2010), but other shrub species are also used. Nests in fork or on horizontal limb of small tree, shrub, or vine, at height of 0.6-6.4 m (mean usually about 2-3 m) (Harris 1991), with dense vegetation above and around the nest. Eats mainly insects caught in fight, sometimes gleans insects from foliage; occasionally eats berries. In breeding range, forages within and occasionally

above dense riparian vegetation. Much of its historical riparian habitat has been lost or degraded (GBBO 2010). Highly sensitive to changes in its breeding habitats, especially related to habitat structure and hydrology. Challenged by the loss, degradation, and fragmentation of lowland riparian habitat due to water diversions and improper riparian grazing by livestock (WAP 2012).

Long-billed curlew

Breeds in grassy meadows, generally near water. Nests in moist meadows, on ground usually in flat area with short grass, sometimes on more irregular terrain, often near rock or other conspicuous object. In Nevada, recent study documented nesting in unharvested wet meadows as well as in short grass adjacent to wet meadows when meadows were flooded. Broods move immediately into tall grass in wet meadows after hatching (Hartman and Oring 2009).

Feeds on various insects (grasshoppers, beetles, caterpillars, etc.), and some berries. During migration also feeds on crayfishes, crabs, snails, and toads. Grasshoppers and carabid beetles are dominant in the chick diet in Idaho (Redmond and Jenni 1985). May obtain insect larvae by probing into loose soil (Allen 1980). Predation by curlews on nestling birds of other species has been observed. Picks food from ground or water, probes with bill in sand or mud in or near shallow water, plucks berries (WAP 2012).

This species is challenged by loss of wet meadows to water diversions, groundwater pumping or development, in addition to loss of flood-irrigated agricultural fields to habitat conversion. Also vulnerable to untimely livestock grazing, haying, or dragging that cause inadvertent nest losses (Dugger and Dugger 2002, Paige and Ritter 1999).

Within the EDO, very high breeding density occurs in northern Ruby Valley, primarily on privately owned agricultural lands.

Sandhill crane

Breeds in northeastern, east-central, and western Nevada. Also congregates in large numbers in migration in eastern Nevada. Open grasslands, marshes, marshy edges of lakes and ponds, river banks (Terres 1980). Nests on the ground or in shallow water on large mats of vegetation, bogs, fens, or wet forest meadows. Exhibits high fidelity to breeding territories (Littlefield 1995). Roosts at night along river channels or natural basin wetlands. Often feeds and rests in fields and agricultural lands. Feeds on roots, tubers, seeds, grain, berries, small vertebrates (mice, birds, snakes, lizards, etc.), earthworms, and insects. Forages in marshes, meadows, pastures, and fields (Terres 1980). Most food items are obtained on the surface of the ground or among low vegetation; also may use bill to dig out roots, tubers, and frogs. Feeding in fields occurs primarily on excess grains in non-breeding areas. Young forage for invertebrates during first few weeks of life (WAP 2012).

Migratory populations begin moving north in late February to mid-March. Gregarious in winter and in migration (WAP 2012). The Nevada population estimate is 650-1,000; trend is stable to increasing, although low recruitment has occurred in some years and should be monitored.

Conservation challenges include loss or degradation of wet meadow, marsh, and riparian habitat due to habitat conversion (agriculture, gravel operations, development, etc.), water diversions, possible impacts

of groundwater pumping in occupied areas, heavy livestock grazing during nesting and fledging season, particularly in wet meadows, and invasive plants. Also, loss of traditional crop agriculture in migration stopover sites, and early haying may impact nests or young (WAP 2012).

Sensitive Raptors

The EDO BLM is fortunate to have a long-term partnership with HawkWatch International (HWI), a raptor research and conservation organization. HWI established a raptor counting and banding operation in the Goshute Mountains of eastern Elko County, and has been operating this site each fall since 1980 with the primary objective of tracking long-term regional population trends of diurnal raptors. This is one of the longest running standardized, raptor migration monitoring efforts in western North America, with the 2016 season marking the 37th consecutive season of banding and the 34th consecutive fall count at the site. Annual counts range between ~12,000–25,000 migrants of up to 19 species, making this one of the largest known concentrations of migrating raptors in the western U.S. and Canada (Oleyar and Watson 2017).

In 2016 at the Goshutes Site, HWI counted 11,640 migrants of 18 raptor species, 21% lower than the site average. The composition of the 2016 flight broke down as follows: 51% accipiters, 32.1% buteos, 8.5% falcons, 3.2% vultures, 1.8% harriers, 1.3% eagles, and 0.5% ospreys. The proportions of buteos and northern harriers in the flight were above historic averages; accipiters, eagles, ospreys, and falcons made up a significantly smaller proportion of the flight compared to site historic averages. The most commonly observed species in 2016 in descending order were: Red-tailed Hawks (28.6% of the total), Sharp-shinned Hawks (27.9%), Cooper's Hawks (16.9%), American Kestrels (7.6%), Turkey Vultures (3.2%), Swainson's Hawks (1.5%), and all the other species (≤ 1%) (Oleyar and Watson 2017).

Northern Goshawk

Aspen stands, which are limited in extent and subject to several threats, are the key habitat feature for breeding goshawks in northeastern Nevada (GBBO 2010, Wildlife Action Plan Team 2012). Nests are generally constructed in the largest trees within dense, large tracts of mature or old growth aspen stands with high canopy closure (60-95%) and sparse ground cover, near the bottom of moderate slopes, and near water or dry openings (Bull and Hohmann 1994, Daw and DeStefano 2001, Hargis et al. 1994, Reynolds et al 1982, Siders and Kennedy 1994, Squires and Ruggiero 1996, Younk and Bechard 1994). Nevada Department of Wildlife aerial and ground surveys from 2000-2010 (Morrison et al. 2011 *in* GBBO 2010) suggest population declines in eastern and southern Nevada, with more than half of historical nesting sites currently unoccupied (GBBO 2010). Regression analysis from the Goshutes HawkWatch data indicate that northern goshawk passage rates, and presumably populations, are declining (Oleyar and Watson 2016).

Peregrine Falcon

This species utilizes cliff habitat for breeding and nesting, often in close proximity to habitats that concentrate avian prey species, such as marshes. On cliffs, nest ledges are commonly sheltered by an overhang (Palmer 1988, WAP 2012). Nesting since 1960 has only been confirmed in Clark, White Pine, and Lincoln Counties (WAP 2012).

When not breeding, peregrine falcons occur in areas where prey concentrate, including marshes, lake shores, rivers and river valleys, cities, and airports. They feed primarily on birds (medium-size passerines up to small waterfowl); rarely or locally, small mammals (e.g., bats), lizards, fishes, and insects (by young birds) may be taken (WAP 2012). The EDO contains limited breeding habitat for this species but individual peregrines may migrate through seasonally. An ACEC was established for peregrines in the Wells Resource Management Plan (1985) near Blue Lakes on the Nevada/Utah border. This is the only ACEC within the EDO, however, peregrines have not been documented to breed there. Winter and transitional use has been documented.

Golden Eagle

The golden eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA), the MBTA, and is classified as Sensitive by Nevada BLM. The golden eagle is a yearlong resident and common breeder throughout Nevada; however, eagle densities and nesting activity are greatest in the northern third of Nevada (Herron et al. 1985). Nesting golden eagles prefer cliffs overlooking sagebrush flats, pinyon-juniper forests, salt desert shrub, or other habitat capable of supporting a suitable prey base. The highest densities of nesting golden eagles are found along river systems where cliffs border the entire length of the river; lower densities are found in pinyon-juniper and salt desert shrub communities. Wintering golden eagles congregate in broad valleys interspersed with agricultural croplands, sagebrush, and desert shrub communities (Herron et al. 1985, Johnsgard 1990). Recent data suggest golden eagle populations are generally stable throughout the western US and in the Great Basin Bird Conservation Region (Millsap et al. 2013). Several active and historic nest sites occur within the EDO. Regression results from the Goshutes HawkWatch data indicate a long-term decline in regional Golden Eagle populations (Oleyar and Watson 2016).

Bald Eagle

The bald eagle is protected under the BGEPA, the MBTA, and is designated Sensitive by Nevada BLM. In Nevada, the bald eagle is a spring/fall migrant and winter resident. Suitable winter habitat is widely dispersed on uplands, irrigated lands and riparian areas throughout the EDO. Winter populations are stable to increasing (Buehler 2000 and Sauer et al. 2008 *in* GBBO 2010, WAP 2012). One active and one historic nest site occur within the EDO.

Ferruginous and Swainson's Hawks

Ferruginous and Swainson's hawks often occur sympatrically during the breeding season. In Nevada, ferruginous hawks prefer open, rolling sagebrush near the pinyon-juniper interface (GBBO 2010). Their favored prey is rabbits (*Lepus* spp.), but they are also known to take other small rodents and occasionally birds and reptiles. The species has probably undergone recent population declines within Nevada (GBBO 2010). The Swainson's hawk is a summer resident in Nevada (Herron et al. 1985). Often associated with agricultural and riparian areas, it will also use sagebrush steppe, nesting in scattered junipers, cliffs or other trees (GBBO 2010). Favored prey on breeding territories includes rabbits and ground squirrels. Local populations have likely been in recent decline (GBBO 2010), however, recent restrictions on pesticide use on their wintering grounds in South America appear to have resulted in positive population trends. Ferruginous hawks occasionally overwinter in northern Nevada while Swainson's hawks leave the area entirely. Several nest sites of both species occur within the EDO.

Burrowing Owl

Abandoned mammal burrows, such as those created by badgers (*Taxidea taxus*) and coyotes (*Canis latrans*), provide nesting habitat for burrowing owls. Habitat requirements include low vegetation and suitable prey including a variety of arthropod, small mammalian and reptilian species. Burrowing owls typically breed or loaf in sparsely vegetated areas which may include disturbed or open sites, such as recent burns, road edges, or degraded areas near troughs, corrals, or livestock mineral licks. While this species has undergone large historical declines in Nevada, recent trends are uncertain (GBBO 2010).

Flammulated owl

Montane forest, usually open conifer forests containing pine, with some brush or saplings (WAP 2012). Shows a strong preference for ponderosa pine and Jeffrey pine throughout its range (McCallum 1994a). Prefers mature growth with open canopy; avoids dense young stands. Habitat preference differs where pine habitats do not exist, such as in Nevada, where it may be associated with mature quaking aspen, riparian zones with various poplar species, Douglas-fir, and spruce-fir zones with a mixture of Engelmann spruce, subalpine fir, and white fir (McCallum 1994b).

Found in cooler, semi-arid climates with a high abundance of nocturnal arthropod prey and some dense foliage for roosting (McCallum 1994a). Most often found on ridges and upper slopes (Bull et al. 1990, Groves et al. 1997). Most often nests in an abandoned tree cavity made by Pileated Woodpecker, flicker, sapsucker or other large primary cavity nester, at heights from 1 to 16 meters. Occasionally uses natural cavity or nest box. Feeds mainly on nocturnal arthropods, especially owlet moths (Noctuidae), beetles (Coleoptera), and crickets and grasshoppers (Orthoptera). Hunts exclusively at night.

Within the EDO, found in the Goshute Mountains on BLM land, and the Jarbidge and Ruby Mountains (on USFS land) (M. Mika, unpublished report).

Short-eared owl

Breeds in northeastern and east-central Nevada, winter resident throughout the state. Relatively uncommon in Nevada, but it can also be found in diverse types of open country where small mammal populations are sufficiently dense. Voles, their preferred prey, are typically most numerous in wet meadows, grasslands, or crop fields where herbaceous cover is well developed, and short-eared owls often mirror their distribution patterns. Because voles are diurnally active, short-eared owls can often be seen hunting during daylight hours. Short-eared owl populations also tend to follow annual fluctuations in vole abundance, which can be very pronounced (GBBO 2010).

Although Short-eared owls are present year-round in most of Nevada, the species exhibits pronounced seasonal movements, and is migratory in some parts of its range. These owls often roost communally during the winter, and they may breed semi-colonially in some situations (Fondell and Ball 2004). The NV population estimate is 5,000 although trend is inconclusive. Breeding Bird Survey and Christmas Bird Count data indicate a significant decline in North America since 1966 (WAP 2012).

3.2.11.1.2.2. Sensitive Mammals

Pygmy Rabbit

Historically, Nevada comprised a majority of the pygmy rabbit range. Pygmy rabbits are sagebrush obligate species, relying on this shrub to provide cover and food throughout the year. Clusters of sagebrush (*Artemisia tridentata wyomingensis* or *A.t. tridentata*) higher than surrounding vegetation (sagebrush islands) are likely required to support pygmy rabbit populations. Increased sagebrush cover, reduced understory density, as well as absence of cottontail rabbits, cheatgrass (*Bromus tectorum*), and rodent burrows increased the likelihood of pygmy rabbits inhabiting a sagebrush island (Larrucea and Brussard 2008). Disturbance of any kind resulting in reduced sagebrush cover will negatively impact pygmy rabbit populations, which are unlikely to relocate from their resident burrows (Edgel 2013).

Pygmy rabbits dig their own burrows and therefore require loamy, friable soils (Weiss and Verts 1984). Soils will typically contain about 20% clay, providing additional stability for burrows used for several years (Larrucea 2007). Extensive snow burrows are dug and utilized in the winter to access sagebrush forage.

When threatened, pygmy rabbits rely on dense sagebrush cover and close proximity to their burrows for protection. They are not known to travel far from burrows for food (Crowell et al. 2016). Diets consist of approximately 51 percent sagebrush, 10 percent forbs, and 39 percent perennial grasses during the spring and summer. During the winter months diets consist of up to 99 percent sagebrush (Green and Flinders 1980).

Dark Kangaroo Mouse

The dark kangaroo mouse (*Microdipodops megacephalus*) is restricted to stabilized dunes and other sandy soils in valley bottoms and alluvial fans dominated by big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus* spp.) and horsebrush (*Tetradymia* spp.). It typically occurs in sandy habitats below the elevation where pinyon-juniper occur and above those habitats where greasewood and saltbush predominate (Hafner and Upham 2011). Although restricted to sand, it displays a broad tolerance for varying amounts of gravel. Seeds are the primary food source; various insect species are also part of its diet. Individuals are underground in burrows when inactive and during hibernation in the winter (WAP 2012). Suitable habitat is present in the EDO, but the extent of its distribution and abundance is unknown.

Inyo shrew

In Nevada, primarily known as a montane species found in coniferous forest along streams in canyon bottoms. Inyo shrews are voracious hunters. They feed primarily on insects and other small invertebrates (worms, molluscs, centipedes, etc.). They may also feed on bodies of wind-borne insects deposited at higher elevations. No reproductive information is available (Hoffmann and Owen 1980). Inyo shrews are active throughout the year and are not entirely nocturnal, but partly crepuscular. Shrews are seldom captured in conventional small mammal traps which may be the reason they are thought of as rare. They are more commonly captured using pitfall traps. Population trend is unknown and the species' distribution is poorly understood, but it is known to occur in the southeastern portion of the EDO (WAP 2012).

Merriam's shrew

Found in various grassland habitats, including grasses in sagebrush scrub/pinyon-juniper habitat, and also in mountain-mahogany and mixed woodlands (Clark and Stromberg 1987, Benedict *et al*. 1999). Feeds

primarily on lepidopteran caterpillars, beetles, cave crickets (Ceuthophilus spp.), ichneumon wasps (Ichneumonidae), and spiders, as well as other arthropods (Johnson and Clanton 1954, cited in Verts and Carraway 1998; Clark and Stromberg 1987). This shrew seems to prefer drier habitat than do other shrews. They may utilize burrows and runways of other animals (Wilson and Ruff 1999) and are active throughout the year (WAP 2012).

Merriam's shrews are not thought to be abundant anywhere; at known sites, several hundred trap-nights are needed to capture one individual (Verts and Carraway 1998). Threats to the species are poorly understood, but it is likely that conversion of grassland and shrub-steppe habitat due to wildfires and conversion to invasive annual grasses threatens the species (WAP 2012).

Bats

There are 17 bat species in the EDO classified as Sensitive (Table 9). The listed bats are both migratory and resident in Nevada with some going into stages of torpor during the winter months, seeking refuge in hibernacula. Roosting sites for bats are variable depending on time of day, temperature, location, and species. Anthropogenic roosting sites include buildings, mines, and bridges. Natural roosting sites include trees, caves, rock crevices, wood piles, tree hollows, peeling bark, and rocky cliffs. Preferences for day, night, and maternity roost locations depend on species.

The Revised Nevada Bat Conservation Plan (Bradley et al. 2006) describes eight major habitat types for bats within Nevada:

- Bridges and buildings
- Natural caves, mine shafts and mine adits
- Cliffs, crevice and talus slopes
- Desert wash foraging habitat
- Forest and woodland foraging habitat
- Tree roosting habitat
- Water source foraging and watering habitat
- Other known foraging habitats

The BLM EDO contains all of these habitat types.

Western Red Bat

This tree roosting bat forages for insects such as large moths in open areas, often adjacent to riparian habitat. Thought to be a migratory species, it is still unknown if the western red bat may be a year-long resident in some areas. In Southern Nevada the western red bat was found to equally utilize riparian marshes, mesquite bosque, riparian woodland, and riparian shrubland (Williams et al. 2006). No research has been completed to determine habitat use in northern Nevada.

Little Brown Myotis

Habitat for the little brown myotis ranges from sea level to high elevation alpine areas. Foraging occurs over open water and along the edge of water near riparian vegetation. Diets are mainly comprised of

aquatic insects and occasionally other flying insects. Day and night roosts can be found in buildings, trees, woodpiles, and occasionally caves; with maternity roosts located in crevices, hollow trees, and most commonly, buildings (Fenton and Barclay 1980). In the eastern portion of their range caves and mines are used as hibernacula, however little is known about winter habits in the western portion of their range, including Nevada.

Yuma Myotis

Yuma myotis is a resident bat in Nevada which hibernates during the winter months. Well adapted to anthropogenic features, this bat is known to roost in buildings, mines, and bridges at night. During the day, trees, caves, and rock crevices are added to the list of anthropogenic roosting sites. Unmoving, open water is utilized to forage for midges, caddisflies and other aquatic insects.

California Myotis

Buildings, rock crevices, tree hollows and peeling bark provide day roosting habitat for the California myotis. This resident bat undergoes extensive periods of torpor during the winter, occasionally foraging when necessary during this time. Foraging takes place over and along the vegetation canopy, bare ground, and open water. Moths and flies make up a majority of the California myotis diet.

Spotted Bat

The spotted bat depends on high rocky cliffs and crevices for roosting. This bat forages for moths and other insects while in flight over riparian areas, in forest openings, pinon-juniper woodlands, meadows and agricultural fields. In Nevada spotted bats have been documented in pinyon-juniper woodlands containing interspersed sagebrush and nearby cliffs (Geluso 2000).

Long-legged myotis

The long-legged myotis is widespread throughout Nevada in upper elevation woodlands and forests. Trees comprise the main maternity roost although there are at least 3 maternities colonies known that occur in mines. Caves and mines may also be used for large bachelor roosts as well as for general night roosting. Crevices and cliff faces have also been found to provide alternate roosting habitat. However, the specific roosting requirements of this species in all habitat guilds is generally unknown and needs further investigation. Foraging on soft bodied insects, moths make up a majority of its diet.

Western small-footed myotis

Occurring in arid habitats, the western small-footed myotis commonly roosts in rock crevices and rock faces on cliffs and in tallus fields. The western small-footed myotis can occasionally be found roosting in barns and under bark crevices. This bat forages along cliffs for small moths, beetles and flies.

Western pipistrelle

One of the smallest bats in North America, the western pipistrelle inhabits desert environments in the southwestern United States. Roosting sites consist of rock crevices, mines, and buildings, but this bat can

also be found in burrows and under rocks. The western pipistrelle forages for mosquitos, flies, caddisflies, moths, and other insects while in flight.

Pallid bat

The pallid bat is migratory and commonly found in arid landscapes with rocky outcrops near water. Its range extends from western Canada to western Mexico. Foraging occurs in and among vegetation as well on the ground surface, with diet consisting of moths, crickets, centipedes, scorpions, beetles, grasshoppers, and other ground dwelling insects. Roosting sites consist of caves, mines, rock crevices, hollow trees and buildings.

Townsend's western big-eared bat

This subspecies of Townsend's big-eared bat occurs in the south-western United States. Habitat includes desert scrub, pinion-juniper, pine, and mixed conifer forest. Roosting sites are found in mines, limestone caves, buildings, and occasionally hollow trees with cavern-like qualities. In Nevada populations of Townsend's western big-eared bat are resident and distribution is highly impacted by the presence of mines and caves. Small moths make up a majority of this bats diet along with other small, soft bodied, flying insects. Townsend's western big-eared bats are not known to migrate long distances and hibernate during the colder months.

Mexican free-tailed bat

Select a variety of day roosts including cliff faces, mines, caves, buildings, bridges, and hollow trees. Although colonies number in the millions in some areas, colonies in Nevada are generally several hundred to several thousand (largest known colonies have been estimated at ca. 70,000-100,000). Some caves may be used as long term transient stopover roosts during migration. Food items include a variety of insects but moths predominate. Foraging occurs in the open and may range to high altitudes. Some individuals are known to travel more than 40 km to reach feeding grounds and feed more than 300 m above the ground.

Fringed myotis

This widely distributed but uncommon bat species is found in high desert and coniferous forests habitats across the western part of the United States. Fringed myotis are known to migrate and roost in caves, mines, and buildings. Food items vary but there appears to be a selection for small beetles. Foraging occurs in and among vegetation, with some gleaning activity. Diet is primarily beetles, but includes a variety of other taxa including moths. Radio tracking in southern California suggests foraging along forest edges and over the forest canopy.

Big brown bat

Occurring throughout North and Central America, the big brown bat is known to prefer man-made structures for roosting such as buildings and bridges, though it is also found in rocks and trees. In areas with a moderate climate this bat will go into extended periods of torpor and sometimes migrate to warmer climates. When found in areas with harsh winters these bats are known to hibernate in caves. The big brown bat will forage in nearly a variety of habitat, with no preference for canopy type, open areas, or

riparian areas. Beetles make up a majority of the big brown bat diet, though they are also known to consume moths, ants, termites, and other insects.

Silver-haired bat

Migrating to winter hibernacula, the silver-haired bat can be found throughout most of North America. Hibernation often takes place in mines, caves, and trees. It is known to roost in hollow trees, snags, under bark, in rock crevices, and buildings and is thought to be primarily a tree roosting bat. Foraging generally occurs near water in forested habitats and prey includes moths, midges, leafhoppers, beetles, ants, termites and other insects. The silver-haired bat is a generalist when foraging and does not have a preference for any specific insect.

Hoary bat

Roosting in deciduous and coniferous trees, the hoary bat ranges from Northern Canada to South America. California and Mexico provides wintering habitat for this migratory bat. Known to capture large prey; moths, beetles, and dragonflies make up a majority of the hoary bat diet. Foraging takes place over water, above canopy, and in clearings.

Long-eared myotis

In Nevada the long-eared myotis is a resident bat often inhabiting coniferous forest at higher elevations where average temperatures are lower. Commonly found in pinyon-juniper woodlands in northern Nevada these bats can also be found in sagebrush steppe. Day and night roosting sites rarely overlap in location. Day roosts generally consist of exfoliating bark, hollow trees, and rock crevices. Occasional day roosting sites can be found in mines, caves, and buildings, however these locations provide night roosts. Areas above water or adjacent to riparian habitat provide insects such as moths, small beetles and flies for foraging. The long-eared myotis will also forage in forested areas.

Preble's Shrew

Likely habitat is ephemeral and perennial streams dominated by shrubs, primarily below 2500 m. Recorded habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush (WA), willow-fringed creeks, marshes (OR), bunchgrass associations, sagebrush-aspen associations (CA), sagebrush-grass associations (NV), and alkaline shrubland (UT) (Hoffman et al. 1969, Williams 1984, Cornely et al. 1992 cited *in* WAP 2012).

Preble's shrew is an insectivore. Feeding habits probably resemble other shrews in that they primarily feed on insects and other small invertebrates (worms, mollusks, centipedes, etc.). They are active throughout the year and can be active at any time throughout the day or night, but probably most active during morning and evening hours (WAP 2012). The EDO does contain habitat for this species but little is known about its distribution, abundance and habitat preferences. Recently, mark-recapture sampling has been initiated within the EDO to learn more about this species' distribution, abundance and habitat associations.

3.2.11.1.2.3. Sensitive Reptiles

Northern rubber boa

Rubber boa habitat includes woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water; also riparian zones in arid canyons and sagebrush in some areas (Nussbaum et al. 1983, St. John 2002, Stebbins 2003). Generally this snake is found in or under rotting logs or stumps, under rocks or in crevices, or under the bark of dead fallen trees. The rubber boa is closely associated with riparian areas in Nevada, although periodically found in sagebrush steppe. Diet includes mice, shrews, lizards, lizard eggs, snakes, and small birds. Kills prey by constriction. Rubber boas are largely crepuscular and nocturnal, but may be active by day during the breeding season (WAP 2012).

Desert Horned Lizard

The desert horned lizard generally inhabits two different soil communities; cryptobiotic soils, and loose soils. The preferred vegetation profile for desert horned lizards is short-shrub plant communities with an open understory. The combination of patchwork shrub and loose soils provides suitable foraging opportunities, while loose soils allow for easy burrowing which provides an escape from extreme temperature conditions. Cryptobiotic crusts stabilize the surface as well as subterranean burrows (Newbold and MacMahon 2014). In Nevada these habitats are characterized by big sagebrush in areas with limited grazing to maintain cryprobiotic crusts. The bulk of their diet is primarily made up of large-bodied harvester ants (Jones and Lovich 2009).

When not participating in courtship desert horned lizards are not known to have a complex social structure. Females generally lay their clutch of eggs beginning in May and continue through mid-June (Tanner and Krogh 1973). The species is considered of least concern in the state of Nevada and all across the United States. Local threats are urbanization, agriculture development, and off-road vehicle use however the greater population is not at risk. Predators include prairie falcons, loggerhead shrikes, long-nosed leopard lizards, and striped whipsnakes.

Great Basin Collared Lizard

Great Basin collared lizards are not generally a social species, and are distributed nearly state wide in Nevada with the exception of much of northeastern Nevada and the Carson range in northwestern Nevada. They are found in within the southeastern corner of the EDO. They generally consume insects like crickets, but are also known to eat other lizards including other conspecifics, rarely consuming plant matter. They are inactive during the colder months but generally active by mid-April. Courtship occurs during the early spring, and the eggs are laid in June and July. They prefer desert scrubland, specifically rocky hillsides and canyons (McGuire 1996). Their conservation status is considered stable, however, unregulated commercial capture is a potential threat in Nevada.

Greater Short-Horned Lizard

Greater short-horned lizards are generally solitary when not mating, which generally occurs just after emerging from hibernation in late March into early June. Their young are born two to three months after the eggs are fertilized (Nussbaum et al. 1983). They occupy a variety of habitats ranging from forests to sagebrush habitat in northeastern Nevada. They burrow locally and do not move far from their locality to

find a nesting burrow. They do not have a strong preference for soil substrates, inhabiting stony, sandy, firm, or fine and loose soils. Additionally, while overwintering they do not have a tendency to aggregate like other lizard species (Mathies and Martin, 2008). They primarily feed on ants and other insects.

Long Nosed Leopard Lizard

This species is found throughout the EDO and state, existing in semiarid, scattered shrub-land and low grass ecosystems. The species does not have a strong preference for altitude within the state, but no matter the altitude or habitat type they prefer to inhabit rodent burrows (Nussbaum et al. 1983). They are primarily a ground-dwelling species, however they sometimes climb into bushes. The long-nosed leopard lizard has a diverse diet ranging from insects and spiders to small rodents, reptiles, berries, blossoms, and leaves (Stebbins 2003). The species is inactive in winter, and lay and fertilize eggs in late spring. Individuals in the EDO are most active mainly between May-Aug.

3.2.11.1.2.4. Sensitive Invertebrates

Mattoni's Blue

The Mattoni's blue is a butterfly species thought to be found only within the EDO. The species distribution is likely limited by the presence of its host plant, slender buckwheat (*Eriogonum microthecum laxiflorum*). Slender buckwheat is found at elevations ranging from 5000-10,500ft, with precipitation as low as 8 inches annually. Soil types range from loam to clay and the plant is tolerant of calcium carbonate presence in the soil.

Nevada viceroy

Apparently restricted to Nevada. Known from along the Humboldt River and lower tributaries with additional colonies near Fallon and Fernley. Destruction of willows (*Salix* spp.) along waterways is the major threat; this results in fragmentation and extirpation of local populations. As a riparian obligate dependent upon willows as a host plant, this taxon may be a good monitor of riparian health. Populations declining according to George Austin, butterfly expert (NatureServe 2017).

Monarch butterfly

Breeding populations are widespread and scattered. Requires milkweed (Asclepiaecae) or dogbane (Apocynaceae) as host plants for larvae. This subspecies occurs in migratory populations that obligately overwinter primarily in a small area in the mountains of Mexico, with less than 1% overwintering in a restricted band in coastal California (NatureServe 2017). Breeding populations have declined by as much as 90% in North America, but these declines are most likely related to challenges on the limited wintering grounds. Breeding habitat for the migratory populations is found across much of North America, but most of it is patchy and is often suboptimally managed for Monarch survival (NatureServe 2017).

Goshute mountain snail

Endemic to the Goshute Mountains of eastern EDO (Ports 2004). There is no perennial flowing water in the Goshute Range, therefore the species is found in only a few dry canyons, with collection sites consisting of limestone rockslides with an understory of mountain snowberry (*Symphoricarpos oreophilus*), skunkbush sumac (*Rhus trilobata*), big sagebrush (*Artemisia tridentata*) and oceanspray

(*Holodiscus dumosus*), with an overstory of white fir (*Abies concolor*), limber pine (*Pinus flexilis*) and Great Basin bristlecone pine (*Pinus longaeva*). Collection sites ranged between 2,450-2,750 m (Ports 2004).

3.2.11.1.2.5. Sensitive Plants

The EDO has 21 Sensitive plants. Of those plants, 20 are forbs and one is the tree species, whitebark pine (*Pinus albicaulis*). These species are widely scattered throughout the EDO, often known only from a few occurrences or extremely limited in extent. Most of these species have few, if any, systematic surveys within Nevada and abundance and distribution of several of these species may be greater than what is currently known.

Meadow pussytoes

Occurs in bare, periodically disturbed soil in marginal, seasonally dry parts of moist, often hummocky, alkaline meadows, seeps, and springs, surrounded by sagebrush and grassland associations. Aquatic or wetland-dependent in Nevada. Individual plants are usually in small, dense, unisexual clusters. Plants appear to require maintenance of an open habitat, and decrease with encroachment of taller and/or denser vegetation (NNHP 2017a).

Goose Creek milkvetch

Goose Creek milkvetch (GCM) is a rare plant endemic to the Goose Creek drainage in Cassia County, ID, Elko County, NV, and Box Elder County, UT. The species is known to occupy 2,042 (~15% of the global distribution) acres in the northeastern corner of the EDO. Goose Creek milkvetch typically occurs on sparsely vegetated outcrops of highly weathered volcanic-ash (tuffaceous) soils from the Salt Lake Formation. These tuffaceous outcrops, also referred to as Salt Lake Formation "ashy" outcrops, appear to constitute the optimal habitat for the species throughout its range. Goose Creek milkvetch also occurs in the sandy loam and gravelly sandy loam soils surrounding some but not all of these tuffaceous outcrops (Mancuso and Moseley 1991). Goose Creek milkvetch presence and scattered distribution on the sandier soils appears to be associated with the proximity to occupied tuffaceous outcrops and other unstudied factors related to how favorable the habitat conditions are for the species.

The dominant native species within the general surrounding plant community include: Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), Utah juniper (*Juniperus osteosperma*), green or yellow rabbitbrush (*Chrysothamnus viscidiflorus*), Sandberg's bluegrass (*Poa secunda*), and needle and thread grass (*Hesperostipa comata*). The habitat can vary from stable areas with little erosion to washes or steep slopes where erosion is common.

Goose Creek milkvetch was a candidate species for listing under the Endangered Species Act. In 2015, BLM entered into a Conservation Agreement Strategy (CAS) with the US Fish and Wildlife Service to address threats to GCM. One of the identified threats was livestock trailing in the fragile soils of the tuffaceous outcrops occupied by GCM. Livestock may negatively impact Goose Creek milkvetch because of the direct, physical effects of trampling that can damage or destroy individual plants, and the indirect, effects from range improvement projects that concentrate livestock and degrade the habitat. Range improvement projects include water tanks and associated pipelines, and placement of salt licks and fencing.

The tuffaceous outcrops where Goose Creek milkvetch primarily occurs are steep and contain relatively sparse vegetation; a combination that tends to limit livestock use within the habitat. However, where the species occurs on flatter slopes with sandy soils below or adjacent to the outcrops, these areas may receive more livestock use. Goose Creek milkvetch appears to tolerate some trampling and habitat disturbance from livestock use because Goose Creek milkvetch is present and sometimes abundant along livestock trail margins and road edges. However, Goose Creek milkvetch plants do not occur within heavily used livestock trails (74 FR 46521, September 10, 2009). The tuffaceous outcrops appear to be vulnerable to the establishment of trails because they are comprised of soft and highly erodible soils. Therefore, protection of the tuffaceous outcrops from livestock trail development and protection of all other Goose Creek milkvetch occupied habitat from concentrated livestock use will reduce adverse effects to the species, its habitat, and likely its pollinators.

In arid and semi-arid plant communities, an area of impact known as a piosphere often develops around water sources where the impact radiates outward from the resource along a utilization gradient (Rigge *et al.* 2013, Shahriary *et al.* 2012). Careful placement will help ensure that piospheres do not overlap with and negatively impact GCM populations (Rigge *et al.* 2013).

One-leaflet Torrey milkvetch

Open gravelly hillsides, in scattered juniper and pinyon forest, on limestone (Barneby 1964). Lower foothill and valley habitats from 1600 to 2000 m. Several occurrences noted within the northeastern corner of the EDO but not yet systematically surveyed in Nevada (NNHP 2018, SEINet 2018).

Elko rockcress

Dry, densely vegetated, relatively undisturbed, light-colored silty soils with a high cover of moss and other soil crust components on moderate to steep north-facing slopes in the sagebrush zone, dominated by moss, *Artemisia tridentata* var. *wyomingensis*, *Chrysothamnus viscidiflorus* var. puberulus, and *Poa secunda* var. *secunda*. Also reported but not confirmed from rock crevices. Moss cover may be important for survival of older plants (Lesica and Shelly 1992), and has been substantially impacted by livestock trampling. Threatened by trampling of soil crust by grazing animals, fires and consequent cheatgrass replacement, fire suppression activities, and road construction and maintenance. Systematic surveys have been conducted, but extensive potential habitat remains to be examined (NNHP 2017b).

Barren valley collomia

Lightly disturbed north-sloping rocky soil near drainage bottom, ecotone between *Artemisia tridentata* and *A. arbuscula* associations. Also "calcareous ground under Juniper" (Joyal 1986). Systematic surveys with uncertain results have been conducted. Many more are needed, but are difficult to plan due to the annual habit of the species. This species is currently known in the EDO only from the Pequop Range (NNHP 2017c).

Broad fleabane

Habitat consists of shallow, relatively barren, vernally saturated, otherwise dry, gravelly to sandy soils or bedrock on flats and slopes of volcanic scablands or benches, mostly rhyolitic or basaltic in composition,

in the sagebrush steppe and juniper zones with *Artemisia arbuscula*, *A. tridentata*, etc. Systematic surveys have been conducted in Nevada but are incomplete. At least five occurrences have been documented within the EDO, near Wildhorse Reservoir and in the Independence Mountains (NNHP 2017d).

Beatley buckwheat

According to the Nevada Natural Heritage Database, Beatley buckwheat has never been systematically surveyed in Nevada. Habitat consists of dry, open to exposed, barren, basic, clay or rocky clay soils or crumbling outcrops on slopes and knolls of weathering rhyolitic or andesitic volcanic deposits, mostly on southerly to westerly aspects, in the sagebrush, pinyon-juniper, mountain mahogany, and mountain sagebrush zones, with *Atriplex confertifolia* or *Artemisia arbuscula*, etc. (NNHP 2017e).

Lewis buckwheat

Occurs on dry, exposed, shallow, relatively barren and undisturbed, rocky residual soils on convex ridge-line knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects, but with the densest stands on southerly aspects, codominating with *Artemisia arbuscula* and *Elymus elymoides*. Occasionally found at lower elevations on clay hills derived from silty carbonate or calcium-rich siliceous rock (NNHP 2017f).

Mineral exploration and development, development and maintenance of roads and electronic sites, off-road vehicle travel, trampling by livestock or feral animals, fire and fire suppression activities. Most sites have sustained some level of impacts. Surveys have been extensive, but much potential habitat remains to be examined. Known in Nevada from Elko and Eureka Counties (NNHP 2017f).

Deeth buckwheat

The Flora of North America reports the *glabratum* variety of Deeth Buckwheat is endemic to Elko County, growing on sandy flats and slopes within saltbush and sagebrush communities.

Grimy mousetails

Grimy Mousetails, a long-lived herbaceous plant, is directly tied to soils associated with welded volcanic ash outcrops on the Owyhee Desert vicinity within the BLM EDO. The approximate 0.57-acre site that encompasses the "IL Ranch Population" is on BLM lands within the Upper Fourmile Pasture of the Owyhee Allotment and continues east of a fenceline on Fenced Federal Range. This plant was formerly known as Grimy Ivesia and was a past (1990s) Category 2 - Candidate Species for listing as a threatened or endangered species.

Extensive searches in the 1990s throughout the same Owyhee Desert area and surrounding areas on potential suitable habitat (47 outcrops) by Dr. Robert Holland, a rare plant expert, resulted in finding no additional sites. The only current known existing site on the BLM EDO is the IL Ranch Population. As of 2017, formal efforts have been initiated to protect the site from the potential effects of disturbances associated with livestock trailing and grazing.

Grimes vetchling

Habitat consists of dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel floated from an underlying cherty or partly quartzitized mudstone component of the Schoonover Formation, forming relatively barren patches on mostly steep slopes of all aspects, and supporting a sparse to moderately dense vegetation usually dominated by *Lathyrus grimesii* in association with *Purshia tridentata, Ericameria nauseosa, Artemisia tridentata vaseyana, Leymus cinereus, Bromus tectorum,* and occasionally *Euphorbia esula* and *Trifolium leibergii*. Nearly endemic to the northern Independence Range, with one disjunct site in the southern Bull Run Mountains. Exhaustive surveys from the air and on the ground have been completed (NNHP 2017g).

Davis peppergrass

Hard-bottomed clay playas on volcanic plains in the sagebrush zone with sparse associated *Atriplex confertifolia* and *Artemisia cana*, surrounded by *A. tridentata* vegetation. During spring, the playas are usually inundated up to a foot deep. Not yet systematically surveyed in Nevada, and much potential habitat exists near the known occurrences (NNHP 2017h).

Owyhee prickly phlox

Not yet systematically surveyed in Nevada. One occurrence of the Owyhee prickly phlox has been documented within the EDO, on the extreme western edge of the EDO. Habitat was described as crevices in steep to vertical, coarse-crumbling volcanic canyon walls. Intolerant of water paths or seeps that may form in the rock crevices (NNHP 2017i).

Tiehm's blazing star

Few collections and observations of Tiehm's blazing star have occurred. This plant is only known to grow on alkaline, clay badlands and flats in Lincoln and Nye Counties although extensive surveys in the EDO have not been conducted.

Idaho beardtongue

Nevada populations of Idaho beardtongue are confined to the Goose Creek drainage in the northwestern portion of the EDO. Habitat consists of white rocky weathering outcrops of the Salt Lake Formation in juniper woodland. Found on gentle to steep slopes of all aspects, but most frequently on south to southwest exposures (NatureServe 2017).

Least phacelia

Vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of *Veratrum californicum* (corn lily), *Wyethia amplexicaulis,* and/or *Populus tremuloides* (aspen) stands, in sagebrush swales, along creek bed high-water lines, or around springs, in flat to gently sloping areas. Aquatic or wetland-dependent in Nevada (NNHP 2017j).

Whitebark pine

Whitebark pine grows on thin rocky soils mostly on peaks, ridges, and exposed northerly aspects, usually in the subalpine zone, but descending on acidic altered andesite and other specialized soils well into the

pinyon/juniper zone. Only a few locations within the EDO support populations of whitebark pine including the Ruby, Bull Run, and Jarbidge Mountain ranges. Limited stands may occur on BLM lands on Spruce Mountain. The mountain pine beetle is the greatest threat to whitebark pine.

Cottam cinquefoil

Habitat described as crevices or narrow ledges on outcrops of quartzite or other siliceous metamorphic or granitoid rocks, on all aspects but preferring northerly or shaded exposures, in the upper subalpine conifer zone with *Pinus flexilis, Abies lasiocarpa, Ribes montigenum, Achillea millefolium, Cystopteris fragilis, Potentilla diversifolia, Sedum rosea*, etc. Only one occurrence is known from the EDO, on Pilot Peak. Surveys have been fairly extensive, but substantial potential habitat may remain unexamined. (NNHP 2017k).

Obscure buttercup

Habitat described as meadow-steppe dominated by perennial xerophytic bunchgrasses and broad-leaved herbs. Upper slopes and crest of basalt ridge overlain by loess deposits of varying depth (NatureServe 2017).

Nachlinger catchfly

This plant is known to occur within the EDO boundary in the Ruby Mountains. It is designated Sensitive because it inhabits ecological refugia, or specialized or unique habitats; generally dry, exposed or somewhat sheltered carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, on all aspects but predominantly on northwesterly to northeasterly exposures, mainly in the subalpine conifer zone (NNHP 2017l). A systematic survey has been conducted but much potential habitat remains to be examined.

Rock Violet

Within the EDO, known only from the Pilot Range in extreme eastern Elko County. Habitat is described as seasonally wet crevices in steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls in the subalpine conifer zone. Surveys have been fairly extensive but substantial potential habitat may remain unexamined (NNHP 2017m).

3.2.11.1.3. Migratory Birds

The MBTA of 1918, as amended, implements treaties for the protection of migratory birds. The list of migratory birds can be found in 43 CFR 10.13. Executive Order (EO) 13186, issued in 2001, directed actions that would further implement the MBTA. As required by MBTA and EO 13186, BLM signed a Memorandum of Understanding (MOU) with the USFWS in April 2010, which is intended to strengthen migratory bird conservation efforts by identifying and implementing strategies to promote conservation and reduce or eliminate adverse impacts to migratory birds.

Per the MOU with USFWS, BLM should:

- Evaluate the effects of their actions on migratory birds and identify where take reasonably attributable to those actions may have a measureable negative effect on migratory bird populations;
- Develop conservation measures and ensure monitoring or the effectiveness of the measures to minimize, reduce or avoid unintentional take; and,
- Consider approaches to the extent practicable for identifying and minimizing take that is incidental to otherwise lawful activities including:
    - Altering the season of activities to minimize disturbances during the breeding season;
    - Retaining the integrity of breeding sites, especially those with long histories of use; and,
    - Coordinating with the USFWS when planning projects that are likely to have a negative effect on migratory bird populations and cooperating in developing approaches that minimize negative impacts and maximize benefits to migratory birds.

The EDO contains 16 of the 20 habitat types described for birds in the Nevada Comprehensive Bird Conservation Plan (GBBO 2010). This Plan identified Priority bird species for each of these habitat types. A Priority species is one which 1) regularly occurs in Nevada, and 2) meets one or more of the following criteria as determined by agencies, bird conservation initiatives, legal mandate, or Nevada stewardship responsibility:

a) *Audubon Watchlist*: Red or Yellow List rankings
b) *Partners in Flight North American Landbird Conservation Plan* (Rich et al. 2004): Watch List ranking
c) *Intermountain West Waterbird Conservation Plan* (Ivey and Herziger 2006): High or Moderate Concern rankings
d) *Intermountain West Regional Shorebird Plan* (Oring et al. 2000): Critically Important or Very Important rankings
e) Pacific Flyway portions of the *North American Waterfowl Management Plan* (USFWS 1986, 1998, 2012): High-ranking species with significant presence in Nevada
f) Listed by USFWS under the Endangered Species Act (ESA), including candidate species
g) Protected under the Bald and Golden Eagle Protection Act
h) Significant species stewardship responsibility: ≥ 20% of the estimated global population occurs in Nevada (GBBO 2010; Appendix 1).

Table 10 displays the Priority species for each habitat within the project area; BLM Sensitive Species are indicated by an asterisk.

Table 10. Priority Bird Species and Primary Associated Habitat Types within the EDO (GBBO 2010)

Priority Species	Agriculture	Alpine	Aspen	Cliff	Coniferous Forest	Ephemeral Wetland and Playa	Great Basin Lowland Riparian	Marsh	Montane Riparian	Montane Shrubland	Open Water	Pinyon-Juniper	Sagebrush	Salt Desert Scrub	Springs	Wet Meadow
American avocet						X					X					
American white pelican											X					
Bald eagle*							X				X					
Band-tailed pigeon					X											
Black rosy-finch*		X														
Black tern								X			X					
Black-chinned sparrow										X		X				
Black-necked stilt						X					X					
Brewer's sparrow*										X			X	X		
Burrowing owl*													X	X		
Calliope hummingbird			X		X				X	X					X	
Canvasback								X			X					
Cinnamon teal								X			X					
Clark's grebe											X					
Common loon											X					
Common poorwill										X		X	X			
Dusky grouse			X		X					X						
Eared grebe											X					
Ferruginous hawk*												X	X			
Flammulated owl*			X		X											
Franklin's gull								X			X					

Priority Species	Agriculture	Alpine	Aspen	Cliff	Coniferous Forest	Ephemeral Wetland and Playa	Great Basin Lowland Riparian	Marsh	Montane Riparian	Montane Shrubland	Open Water	Pinyon-Juniper	Sagebrush	Salt Desert Scrub	Springs	Wet Meadow
Golden eagle*				X									X			
Gray flycatcher										X		X	X			
Gray vireo												X				
Greater sage-grouse*										X			X		X	X
Green-tailed towhee			X						X	X		X				
Least sandpiper						X					X					
Lesser scaup								X			X					
Lewis's woodpecker*			X						X							
Long-billed Curlew*	X															X
Long-billed dowitcher						X		X			X					
Northern goshawk*			X		X											
Northern pintail								X			X					
Olive-sided flycatcher					X											
Peregrine falcon*				X												
Pinyon jay*												X				
Prairie falcon				X									X	X		
Redhead								X			X					
Red-necked phalarope						X					X					
Rufous hummingbird			X				X		X						X	X
Sage thrasher*										X			X	X		
Sagebrush sparrow													X	X		
Sandhill crane*	X						X	X								X
Short-eared owl*																X

Priority Species	Agriculture	Alpine	Aspen	Cliff	Coniferous Forest	Ephemeral Wetland and Playa	Great Basin Lowland Riparian	Marsh	Montane Riparian	Montane Shrubland	Open Water	Pinyon-Juniper	Sagebrush	Salt Desert Scrub	Springs	Wet Meadow
Snowy egret							X	X								
Snowy plover*						X										
Swainson's hawk*	X						X						X			
Trumpeter swan								X			X					
Tundra swan								X			X					
Virginia's warbler									X	X		X				
Western grebe											X					
Western sandpiper						X					X					
White-faced ibis	X							X								X
White-throated swift				X			X									
Willet								X								X
Williamson's sapsucker			X		X											
Willow flycatcher*							X		X							
Wilson's phalarope						X		X			X					
Yellow-billed cuckoo							X									

3.2.11.2. Environmental Effects – Terrestrial Wildlife and Special Status Species

The general effects of livestock trailing on terrestrial wildlife include disturbance (i.e., behavioral modification) to individual animals and physical impacts to wildlife habitat:

- Disturbance – Livestock and Human Presence
- Physical, Direct – Trampling of individual animals or important habitat features (e.g., burrows, nests)
- Physical, Indirect - Trampling and incidental grazing of vegetation
- Physical, Indirect - Disease Transmission

These activities would vary in magnitude over space and time during trailing since diurnal movement of livestock would be relatively rapid (generally ~5 miles/day during active trailing), whereas overnighting livestock would increase the magnitude and duration of some impacts.

Disturbance – Breeding Behavior

Disturbance from anthropogenic sources has the potential to impact breeding behaviors of wildlife. Specifically, those species that are tied to discrete breeding areas (e.g. sage-grouse and sharp-tailed grouse leks, territories of monogamous birds) are likely more susceptible to disturbance, whereas species with non-resource-based defense mating systems (e.g., many mammals) (Greenwood 1980) would be able to more easily avoid disturbance impacts.

Noise playback simulating energy development activities has been shown to reduce the number of sage-grouse males displaying at leks as well as increase the amount of fecal corticosterone (an indicator of physiological stress) (Blickley et al. 2012). Although not synonymous with all aspects of trailing activities, use of motorized vehicles (e.g. ATVs, motorcycles, semi-trucks) could alter lekking activities and reduce reproductive success. This impact would likely increase with the frequency of motorized disturbance associated with any given lek.

Disturbance – Nesting/Juveniles

The disturbance of nesting and juvenile individuals of numerous wildlife species can be a direct impact of livestock trailing. In this instance, disturbance is defined as any activity which could result in flushing of adults or young, nest abandonment, or significant loss of prey base. Repeated (or even single events in the case of nesting ferruginous hawks; Olendorff 1993) human intrusions near golden eagle nest sites have resulted in the abandonment of the nest, high nestling mortality due to overheating, chilling or desiccation when young are left unattended, premature fledging and ejection of eggs or young from the nest (Boeker and Ray 1971). Likewise, a positive correlation of OHV trails with songbird nest desertion suggests that motorized disturbance negatively impacts the productivity of songbirds (Barton and Holmes 2007). Motorized disturbance (vehicle use) associated with livestock trailing likely has similar impacts to breeding migratory birds and.

Trailing along existing roads wherever possible, and instituting seasonal buffers for critical areas would have short and long-term beneficial effects on nesting raptors and other wildlife by reducing vehicle noise and other human-caused disturbances.

Disturbance – Winter/Summer Range

Livestock trailing and associated activities could disturb big game during critical periods (e.g. during the winter when energy reserves are low, or during parturition). However, the large expanses of big game wintering habitat (several million acres in the EDO) would allow individuals to avoid short-term (hours) disturbances represented by trailing events. Minimal trailing activities in riparian areas would preclude disturbance of mule deer fawning habitat. It is also unlikely that elk and antelope utilize areas in the EDO for concentrated calving/fawning activities, therefore the limited spatial scope of trailing activities during the relevant time periods would not have any measurable impacts. Likewise, disturbance to sage-grouse during the winter would be negligible because the extent of this habitat type in the EDO relative to the footprint of potential trailing activities is large. Consequently, there would be no measurable disturbance to big game and sage-grouse winter and summer range, therefore this impact will not be addressed in further analyses.

Physical, Direct (Trampling) – Changes in Habitat Quality/Structure

Changes in wildlife habitat quality and structure can be both a direct and indirect impact of livestock trailing. Livestock-caused defoliation and trampling of palatable forage species occurring on trailing routes could have short-term adverse impacts on upland vegetation by reducing plant populations and their ability to reproduce, thereby limiting resources available to wildlife and the capacity of residual perennial plant communities to reestablish (Anderson and Holte 1981).

Long-term adverse impacts to wildlife and Special Status plant habitat could be caused by changes in the soil structure affecting native vegetation. Soil compaction due to hoof trampling reduces water infiltration, restricts root depth, and limits seed germination (Hart et al. 1993). Mechanical impacts to soils and biological crusts reduce soil stability and fixed nitrogen availability (Belnap 1995, Eldridge and Greene 1994). Soil disturbance from hoof shear and bedding can create habitat for non-native invasive and noxious weed species, increasing the overall competition between annual and perennial vegetation and subsequently degrading the quality of wildlife and Special Status plant habitat (Laycock and Conrad 1981).

Trailing through riparian areas could result in habitat alteration through the removal of vegetation, trampling, and ground disturbance. This could create adverse impacts for wildlife associated with riparian and open water habitat by degrading habitat through sedimentation and streambank alteration, resulting in elevated water temperatures and lower levels of dissolved oxygen (USFWS 1995, pg.24).

Restricting vehicle use to roads and limiting the trailing routes to existing road corridors would provide short and long-term beneficial impacts to wildlife habitat by reducing soil and vegetation disturbances, habitat fragmentation, the establishment and spread of noxious weeds, soil compaction, and the alteration of vegetative community dynamics.

Physical, Direct (Trampling) – Impacts to Animals (via stepping on nests, burrow collapse)
Livestock trailing could potentially damage the nests and burrows of wildlife species. If trailing occurs during the nesting period or while species reside within their burrows, livestock could cause adult mortalities but are more likely to impact juveniles that are present because of their reduced mobility. Birds that nest on the ground (e.g. greater sage-grouse, killdeer, western meadowlarks) or in burrows (e.g. burrowing owls) would be more susceptible to trailing impacts than shrub nesting birds (e.g. sagebrush sparrow) as ground nests are more vulnerable to direct trampling. Large numbers of livestock trailing through Special Status plant occurrences may also result in direct trampling of individual plants, potentially resulting in uprooting, damage or reduced growth and reproduction of individual plants and plant populations.

Physical, Indirect – Grazing (Competition for Forage)
Livestock trailing would have a small potential for forage competition among livestock and big game. Competition for forage may exist under the following conditions: 1) domestic and big-game animals are utilizing the same area, 2) forage plants are in limited supply, or both domestic and big-game animals are consuming the same forage plants (Smith and Julander 1953). However, any quantifiable forage removal would primarily occur in bedding areas and could be minimized or eliminated through the use of supplemental feed.

Physical, Indirect - Disease Transmission (West Nile Virus and Bighorn/Domestic Sheep)
Livestock trailing has the potential to result in increased risk of disease transmission or outbreaks in wildlife populations. Two possibilities include an increase in the likelihood of West Nile Virus (WNV) outbreaks via an increase in habitat for mosquitoes and the infection of bighorn sheep with pathogens carried by domestic sheep.

Some birds, such as greater sage-grouse, are susceptible to WNV so outbreaks of the disease can have deleterious impacts (Naugle et al. 2004). *Culex* spp. comprise the primary mosquito genus responsible for West Nile Virus transmission (Zou et al. 2006), with *C. tarsalis* representing the primary carrier in the western United States. Vegetation along the edges of small bodies of water typify ideal larval habitat for this species (Zou et al. 2006). Consequently, trailing activities that increase trampling in riparian areas and add to the amount of stagnant water where vegetation can persist could increase habitat for *C. tarsalis* and the likelihood of WNV outbreaks. The impacts of WNV to sage-grouse will not be analyzed in detail because stream crossings would have no or negligible effects on streambanks (e.g. crossing would occur across culverts, the substrates are coarse and would not support standing water, or water would not be present during the trailing event).

Trailing activities involving domestic sheep could potentially impact wildlife through disease transmission. While bighorn sheep are susceptible to many diseases, the most important is bronchopneumonia, which is commonly associated with bacteria in the family Pasteurellaceae (Cahn et al. 2011). Domestic sheep are known to carry strains of Pasteurellaceae which are highly pathogenic in bighorn sheep and leads to infectious respiratory disease (Foreyt 1989, 1994). Studies have also shown a negative correlation between the presence and proximity of domestic sheep and bighorn sheep population persistence (Singer et al. 2001, Epps et al. 2004). Pneumonia epizootics resulting from contact between domestic sheep and bighorn sheep can result in all-age die-offs of wild sheep populations, followed by

years of depressed reproductive success due to fatal pneumonia in lambs and low juvenile survival (Cahn et al. 2011).

Comparison of Impacts

Big game
Alternative 1: Big game species inhabiting BLM lands would not be directly impacted by livestock trailing across those lands but bighorn sheep could be indirectly impacted through disease transmission should domestic sheep be trailed on roads adjacent to BLM lands occupied by bighorns. Other impacts to big game, including vegetative degradation at livestock bedding grounds, behavioral impacts due to physical disturbance by livestock and associated herding dogs, herders and vehicles, would not occur as a result of BLM-authorized crossing permits.

Alternative 2: Big game species would continue to be directly and indirectly impacted by livestock trailing activities without minimization of impacts due to resource-specific terms and conditions. Livestock trailing and associated activities would be particularly acute during critical life stages (e.g. during the winter when energy reserves are low, parturition). The risk of transmission of disease from domestic to bighorn sheep could be high depending on the particular trailing route and timing of the crossing.

Alternative 3: Livestock trailing impacts to big game could occur but would be minimized or eliminated by implementation of resource-specific terms and conditions. Impacts to vegetation at livestock bedding grounds would be minimized by being limited to one night as opposed to multiple nights under Alternative 2. Transmission of disease between domestic and bighorn sheep would be minimized due to the implementation of "effective separation" measures as directed in BLM Manual 1730. This alternative would allow for modification or denial of proposed trailing applications to minimize or eliminate potentially significant impacts to big game species and their habitats.

Cumulative Effects of the Alternatives

When added to the Alternative 1: The CESA for big game is the entire EDO, therefore all of the PPRFFAs included in Table 3 would apply to the cumulative effects analysis for big game. Wildfire and subsequent restoration efforts have been and will continue to be the major factors affecting the quality and extent of big game habitat and big game population trends within the CESA. Because the scope and magnitude of the PPRFFAs, particularly wildfire, have been and likely will continue to be large (i.e., 28% of the area within the CESA has burned in the previous 25 years) and severe, the cumulative impacts of Alternative 1 on big game species would be comparatively minor and in most instances negligible, with the exception of potential disease transmission to bighorn sheep, depending on the proximity of domestic sheep trailing to extant bighorn sheep. Alternative 2: Because multiple direct and indirect impacts to big game could result from this alternative, the cumulative impacts of Alternative 2 could result in potentially significant impacts to big game populations.

Alternative 3: Due to the implementation of stipulations designed to minimize or eliminate direct and indirect impacts to big game populations, the cumulative impacts of this alternative, when added to those of the PPRFFAs, would not be expected to impact big game populations.

Terrestrial Special Status Species

Comparison of Impacts

Alternative 1: Impacts to sage-grouse and other Special Status Species from livestock trailing on BLM lands would not occur. Sage-grouse and other Special Status Species occupying BLM lands could still be disturbed by trailing activities on adjacent non-BLM lands and roads but impacts would be negligible and limited in scope and duration. This would be the least impactful alternative to Special Status Species populations.

Alternative 2: Impacts to sage-grouse and other Special Status Species from livestock trailing would continue as trailing currently occurs. Seasonal distance and timing restrictions would not necessarily be implemented and thus breeding and nesting activities could be disrupted by livestock trailing, associated vehicle use, and prolonged concentration at bedding and watering sites. The risk of WNV contraction at and near watering sites would be higher under this alternative due to the greater prevalence of mosquito breeding habitat created by livestock trailing at water crossings and other wet areas. This would be the most impactful alternative to sage-grouse and other Special Status Species and could potentially result in population-level impacts if reproduction rates were chronically reduced. Similarly, without application of appropriate distance stipulations for known Special Status plant occurrences, these species could be directly impacted through trampling during trailing, overnight bedding and/or watering, depending on the plant species.

Alternative 3: Implementation of seasonal distance and timing restrictions would minimize impacts to breeding and nesting sage-grouse. It is unlikely that all impacts could be avoided as some areas within the EDO contain high densities of sage-grouse leks, however, the aforementioned stipulations would likely reduce impacts to such a degree that population-level impacts would be improbable. Risk of WNV contraction due to livestock trailing would be less than Alternative 2 due to stipulations associated with water crossings, particularly in Lahontan cutthroat trout streams. Impacts to sage-grouse and other terrestrial Special Status Species resulting from Alternative 3 would be intermediate between Alternatives 1 and 2 and would not be expected to result in population-level impacts to any of these species.

Cumulative Impacts

Alternatives 1 and 3: Because of the minimization or absence of direct and indirect effects, when added to the impacts of the PPRFFAs, Alternatives 1 and 3 are not expected to result in cumulative impacts to terrestrial Special Status Species populations.

Alternative 2: Vegetation communities have been significantly impacted by wildfire over the previous 25 years, resulting in loss and degradation of 3.47 million acres within the EDO. The impacts of wildfire and other PPRFFAs have negatively impacted habitat availability and quality for Special Status Species, including sage-grouse, pygmy rabbit, Brewer's sparrow and others. Because there would be multiple direct and indirect impacts to Special Status Species resulting from this alternative, when added to the impacts of the PPRFFAs, the cumulative impacts could result in potentially significant impacts to Special Status Species individuals and populations.

Migratory Birds

Comparison of Impacts

Alternative 1: Impacts of the alternatives would largely be similar to those described for Special Status Species. Indirect disturbance to migratory birds inhabiting BLM lands could occur from livestock and associated vehicles trailing on adjacent non-BLM lands and roads. Such impacts would at most consist of temporary displacement and would not be expected to result in significant impacts to populations.

Alternative 2: Impacts to migratory birds from livestock trailing would continue as trailing is currently permitted. Seasonal distance and timing restrictions would not necessarily be implemented and thus breeding and nesting activities could be disrupted by livestock trailing, associated vehicle use, and prolonged concentration at bedding and watering sites. Trampling of ground and/or shrub nests or displacement of incubating females would be likely in areas of active livestock trailing, resulting in loss of nests, eggs or chicks and subsequent decreased breeding productivity. The risk of WNV contraction at and near watering sites would be higher under this alternative due to the greater prevalence of mosquito breeding habitat created by livestock trailing at water crossings and other wet areas. This would be the most impactful of the alternatives for migratory birds.

Alternative 3: Application of appropriate distance and timing stipulations would minimize impacts to migratory birds. Specifically, limiting the duration of stay at bedding and watering sites and requiring active trailing as opposed to potential lingering of livestock in one spot would minimize disturbance to breeding and nesting migratory birds.

Cumulative Impacts

Alternatives 1 and 3: Because of the minimization or absence of direct and indirect effects, when added to the impacts of the PPRFFAs, Alternatives 1 and 3 are not expected to result in cumulative impacts to terrestrial migratory bird populations.

Alternative 2: Vegetation communities have been significantly impacted by wildfire over the previous 25 years, resulting in loss and degradation of 3.47 million acres within the EDO. The impacts of wildfire and other PPRFFAs have negatively impacted habitat availability and quality for migratory birds. Because there would be multiple direct and indirect impacts to migratory birds resulting from this alternative, when added to the impacts of the PPRFFAs, the cumulative impacts could result in potentially significant impacts to migratory bird individuals and populations.

4. Consultation and Coordination

Public involvement for the PEA includes a 30-day public scoping period and a 30-day public review of the PEA. For scoping, the EDO received 16 unique comment letters via a combination of email, fax and postal mail; issues identified are summarized in Section 1.6.

4.1. Native American Consultation

Table 11. Native American Consultation Summary

Tribe Contacted	Type of Contact	Date	Outcome?
Battle Mountain Band Council	letter	6/16/2017	No concerns identified
Te-Moak Tribal Council	letter	6/16/2017	No concerns identified
Duckwater Shoshone Tribe	letter	6/16/2017	No concerns identified
South Fork Band Council	letter	6/16/2017	No concerns identified
Timbisha Shoshone Tribe	letter	6/16/2017	No concerns identified
Yomba Shoshone Tribe	letter	6/16/2017	No concerns identified
Elko Band Council	letter	6/16/2017	No concerns identified
Confederated Tribes of the Goshute Reservation	letter	6/16/2017	No concerns identified
Fort McDermitt Paiute-Shoshone Tribe of Nevada and Oregon	letter	6/16/2017	No concerns identified
Shoshone-Paiute Tribe of the Duck Valley Indian Reservation	letter	6/16/2017	No concerns identified
Wells Band Council	letter	6/16/2017	No concerns identified
Fort Hall Shoshone-Bannock Tribes	letter	6/16/2017	No concerns identified
Ely Shoshone Tribe	letter	6/16/2017	No concerns identified

4.2. Individuals, Organizations and Agencies Consulted

Table 12. Individuals, Organizations and Agencies Consulted

Name	Organization	Date	Outcome?
Matt Glenn	Nevada Department of Wildlife	3/14/2018	Provided consolidated NDOW comments on draft EA

4.3. List of Preparers

Amy Boykin, Rangeland Management Specialist- Socio-Economics, Livestock Grazing, Vegetation
Dayna Reale, Archaeologist- Cultural Resources, Native American Consultation, Paleontology
Robert Hegemann, Hydrologist- Soils, Water Resources
Cameron Collins, Wildlife Biologist- Wildlife
Samantha Cisney, Weeds Specialist- Noxious and Invasive Weeds
Jason Dobis, Natural Resource Specialist (Fuels) - Fire Management, Woodland/Forestry

Kristine Dedolph, Outdoor Recreation Specialist- Recreation, Visual Resource Management, Wilderness Study Areas, Lands with Wilderness Characteristics
Beth Wood, Fisheries Biologist- Aquatic Special Status Species and Riparian Habitats
Aili Gordon, Geologist- Geology, Mineral Resources, Energy Production
Kayla Cox, Realty Specialist- Lands and Realty, Access
Bruce Thompson, Wild Horse and Burro Specialist- Wild Horse and Burros
Harley Gordon, Geologist- Health and Safety

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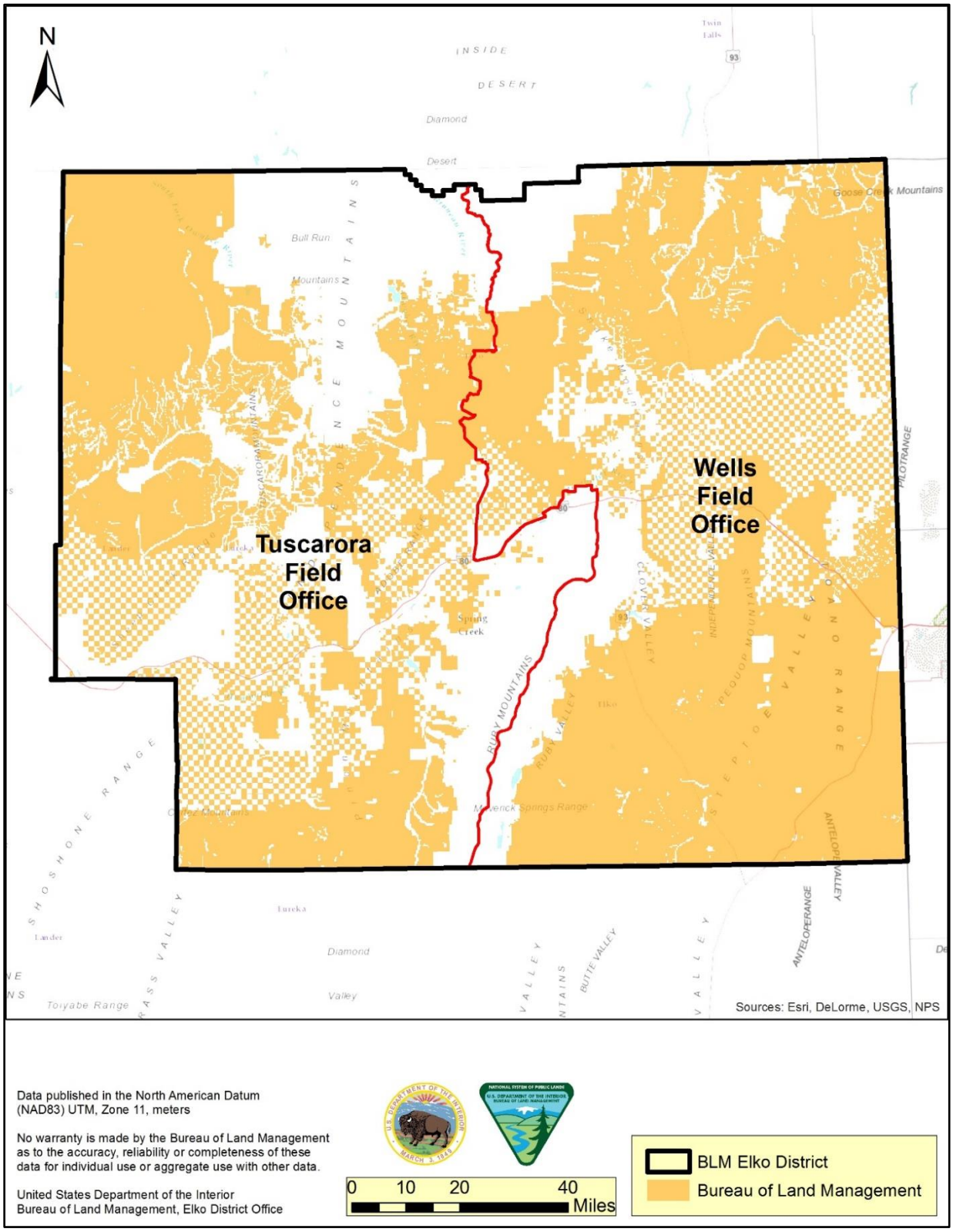
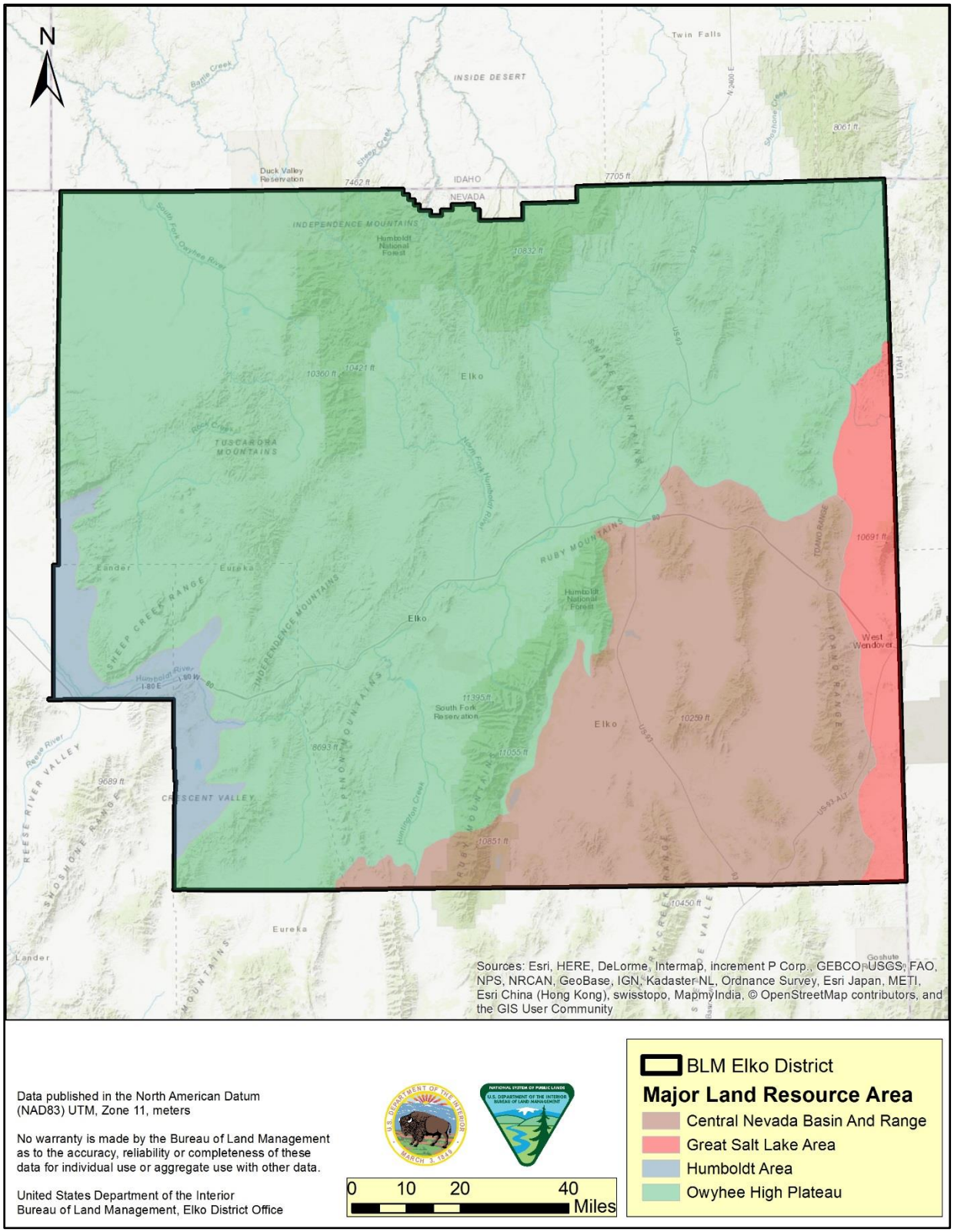
Appendix A. Maps

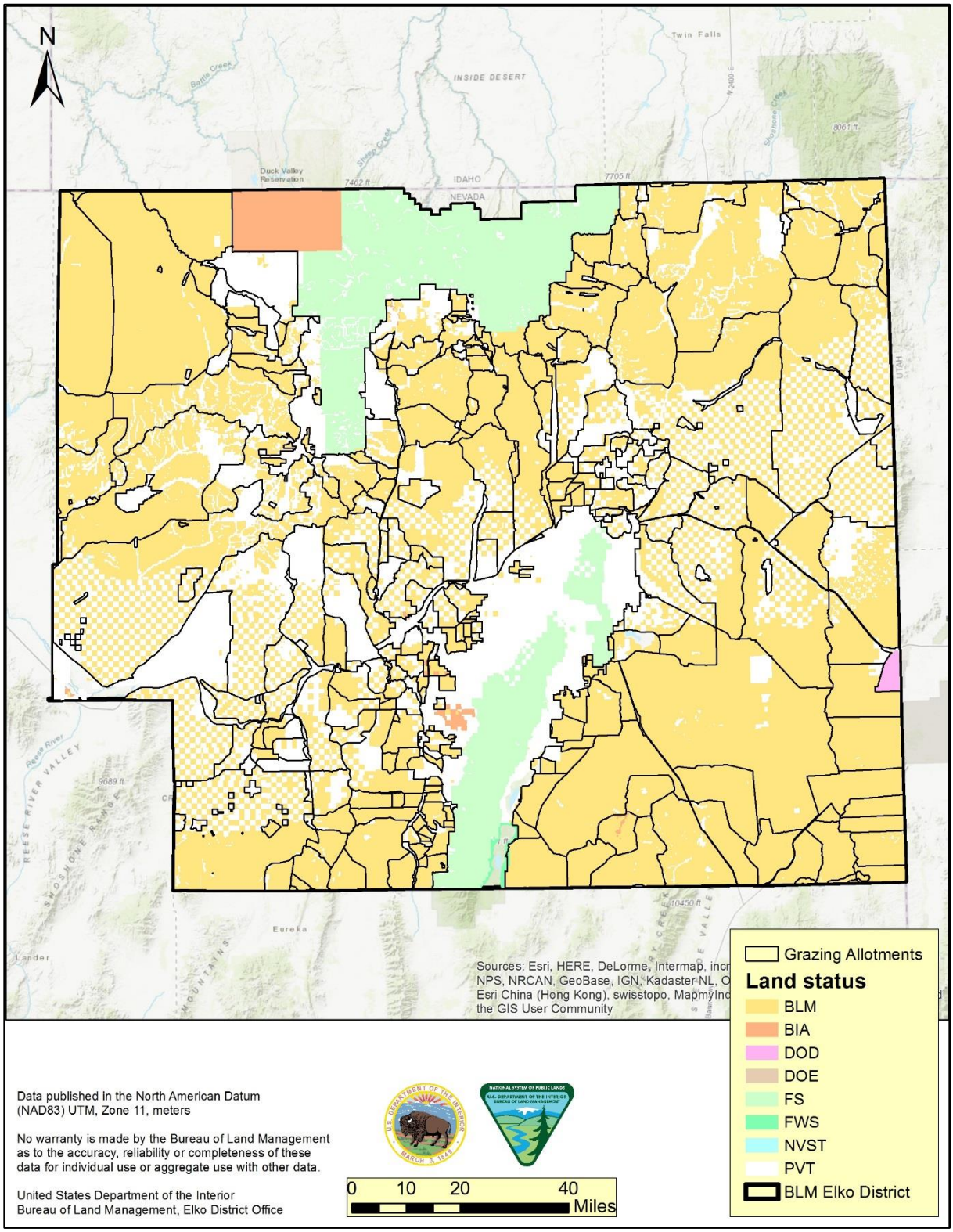
Map 1. Elko District and Field Offices



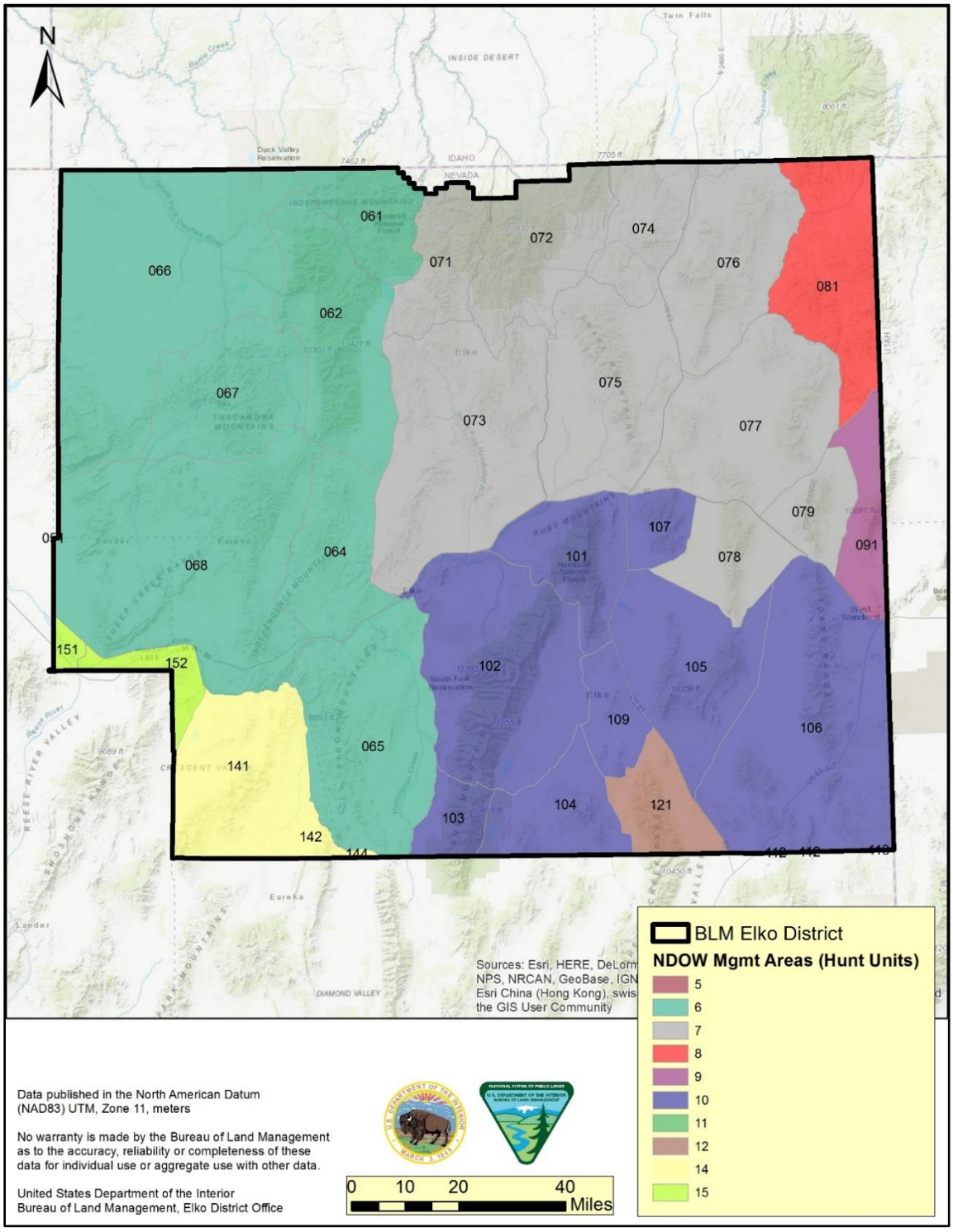
Map 2. Major Land Resource Areas



Map 3. Grazing Allotments in the Elko District

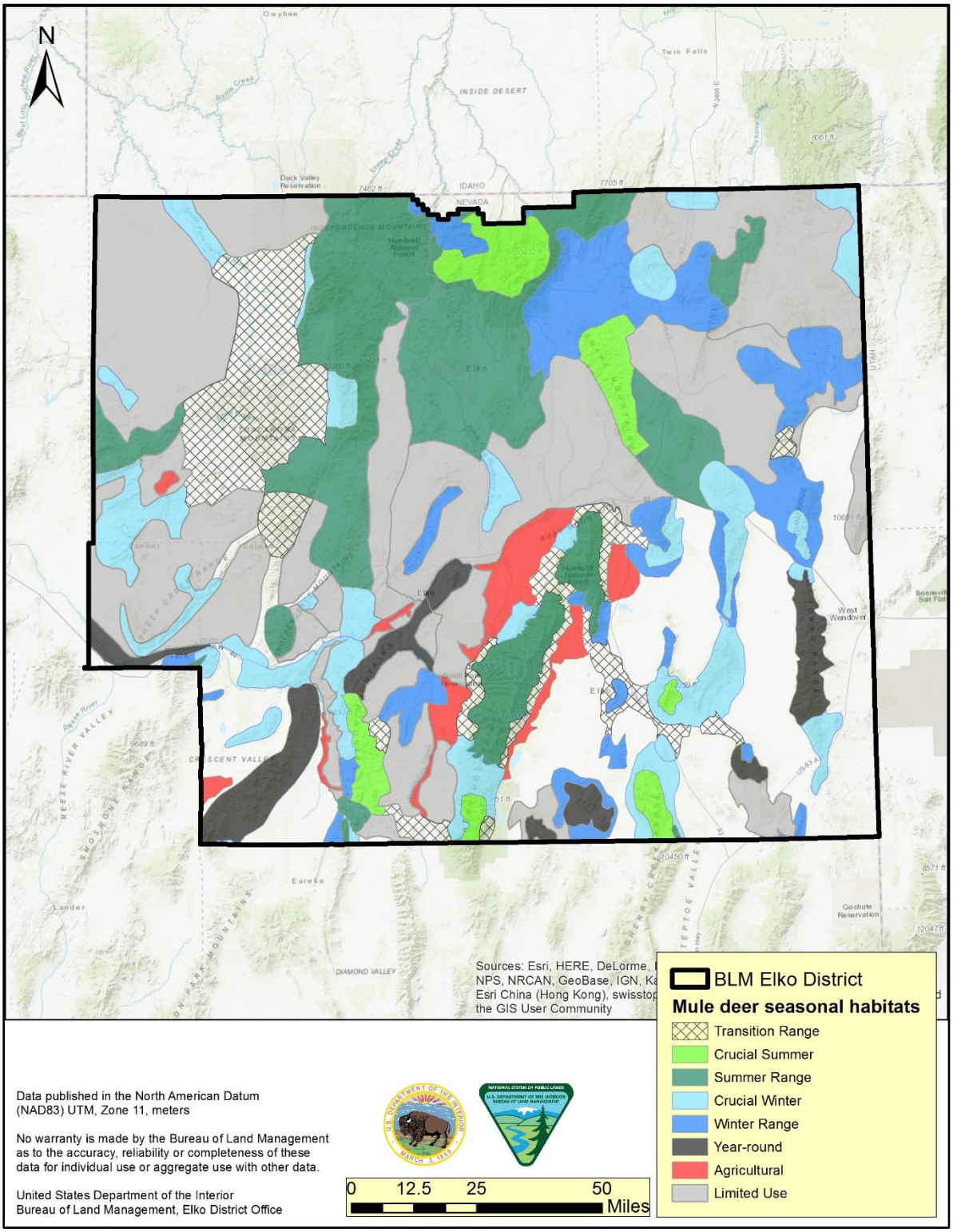


Map 4. Nevada Department of Wildlife Big Game Management Areas and Individual Hunt Units

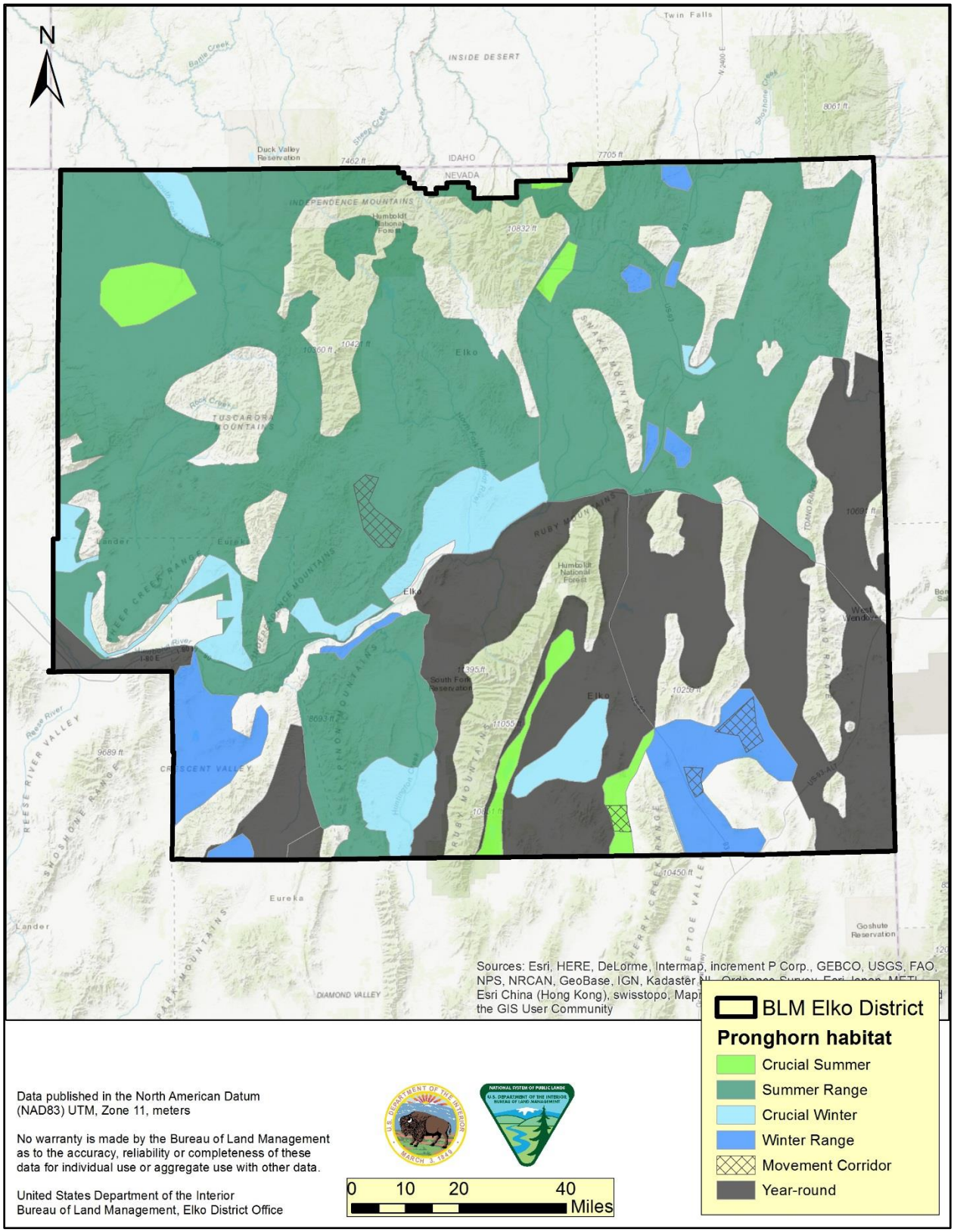


Nevada Department of Wildlife big game management areas are color coded and individual hunt units are 3-digit numerical designations.

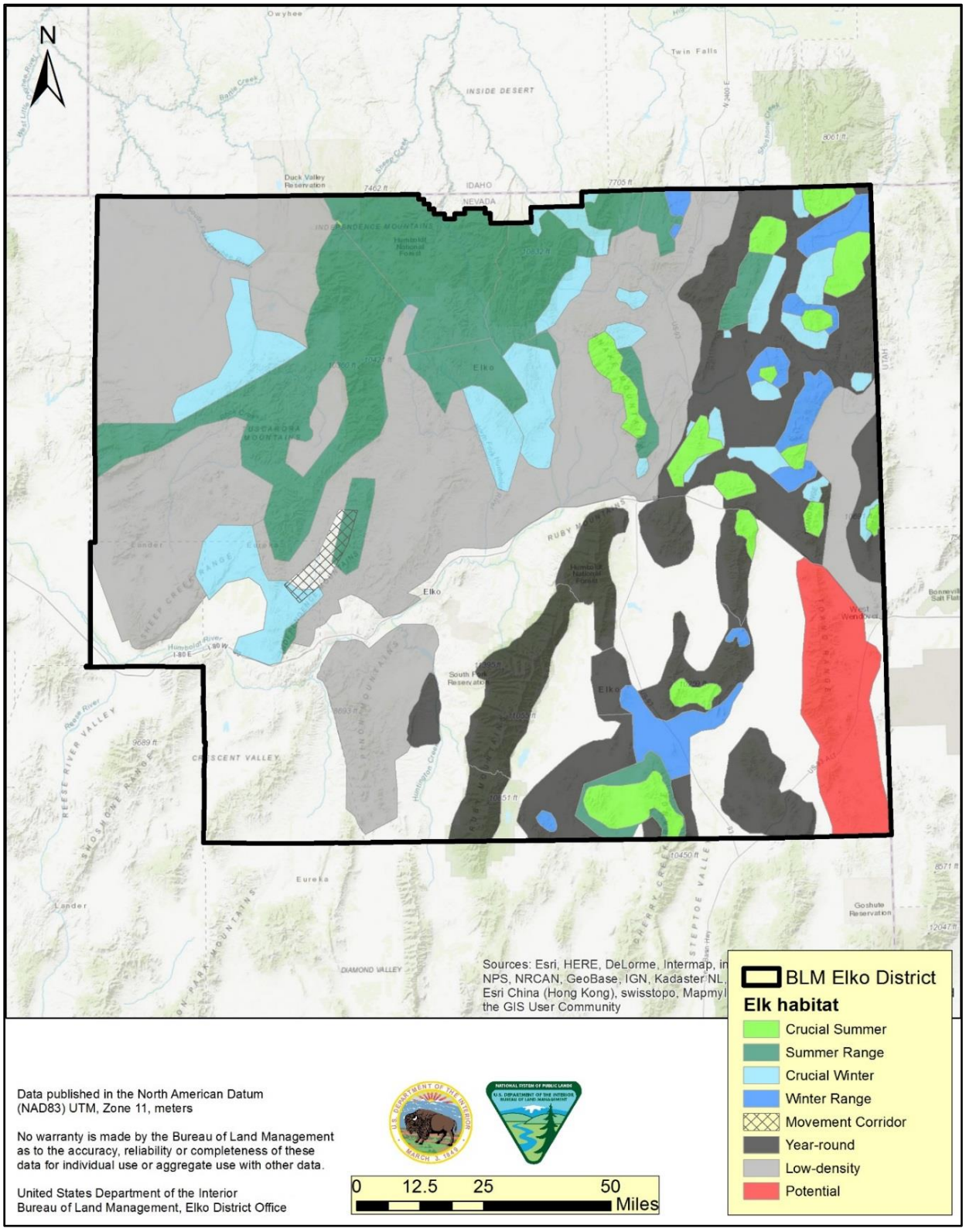
Map 5. Mule Deer Seasonal Habitats



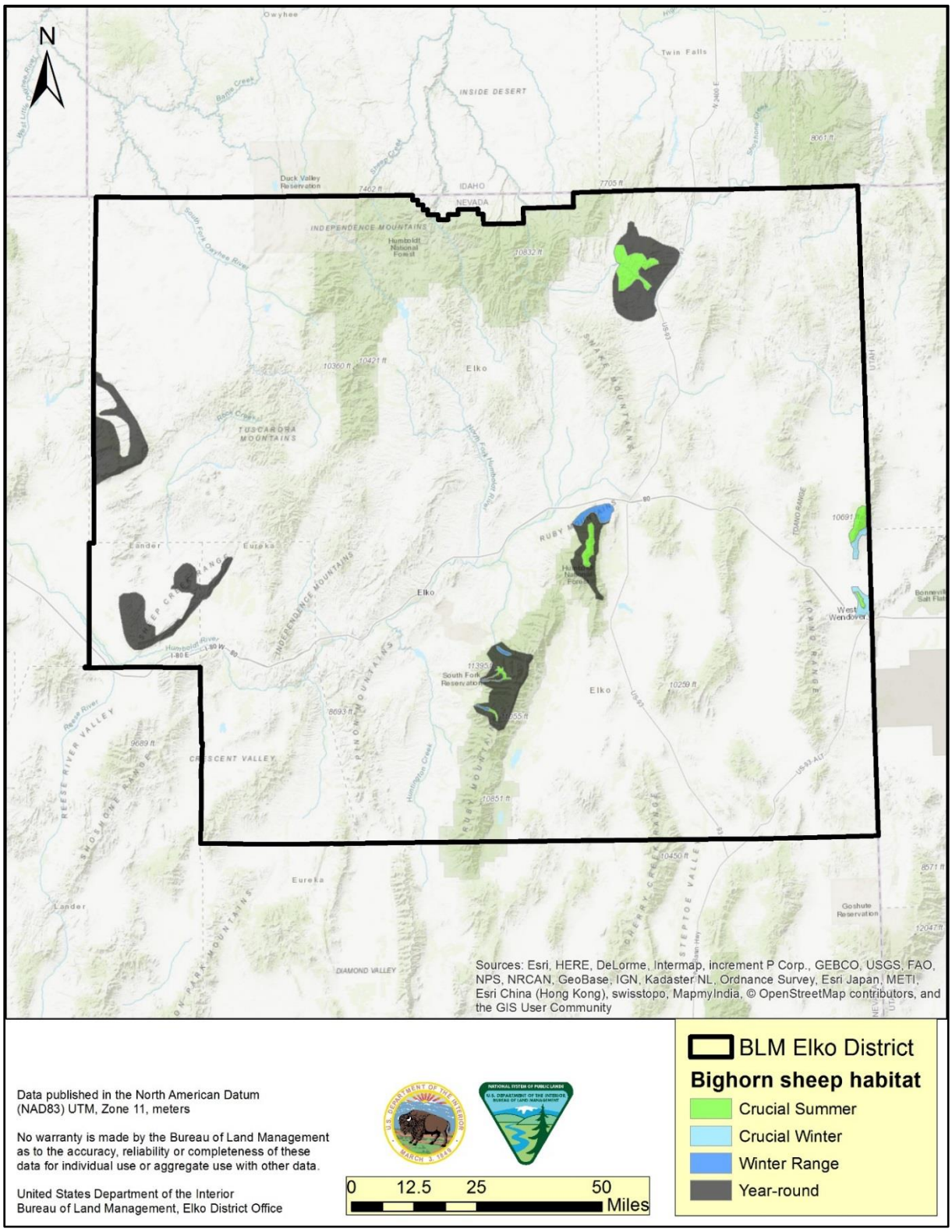
Map 6. Pronghorn Antelope Seasonal Habitats



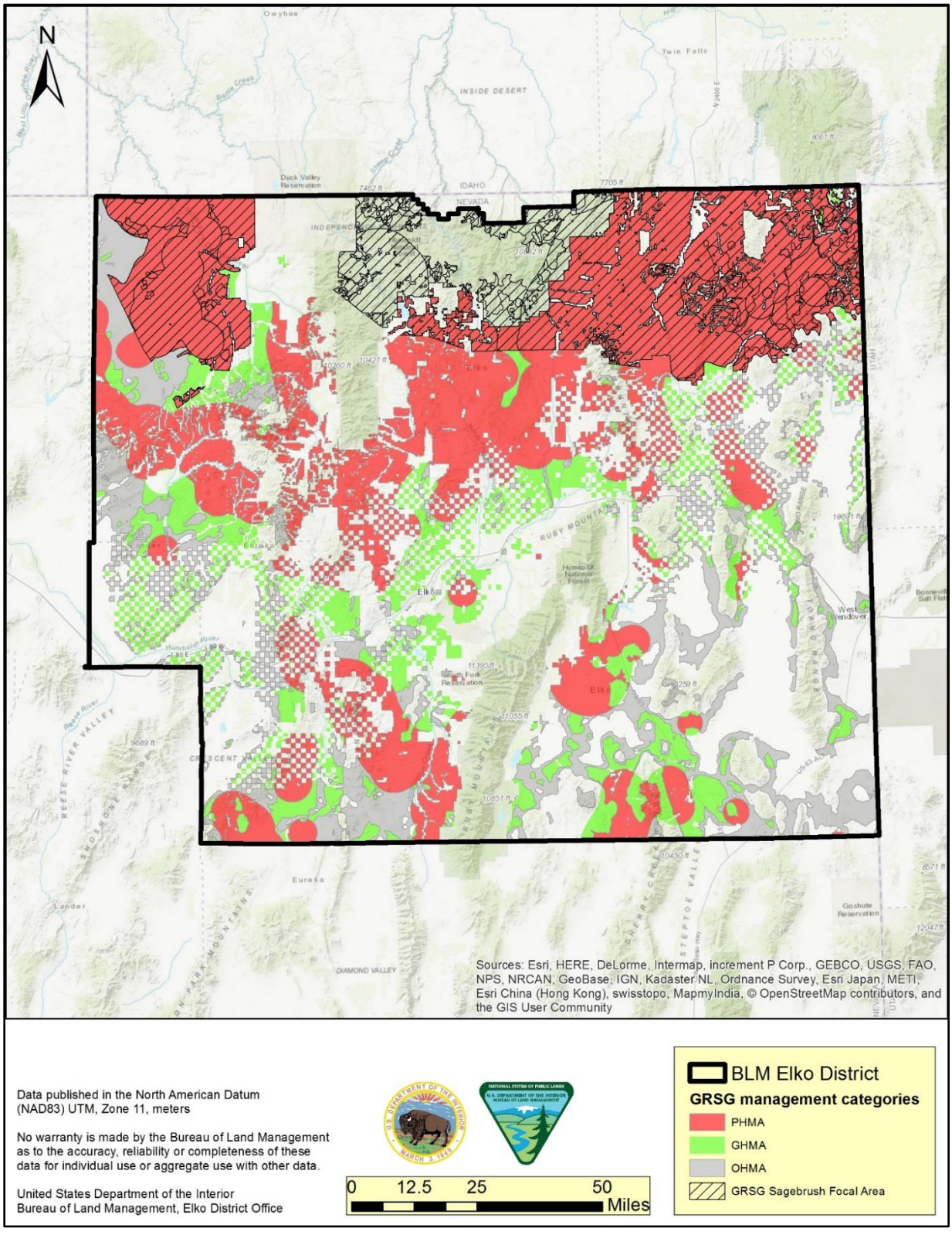
Map 7. Elk Seasonal Habitats



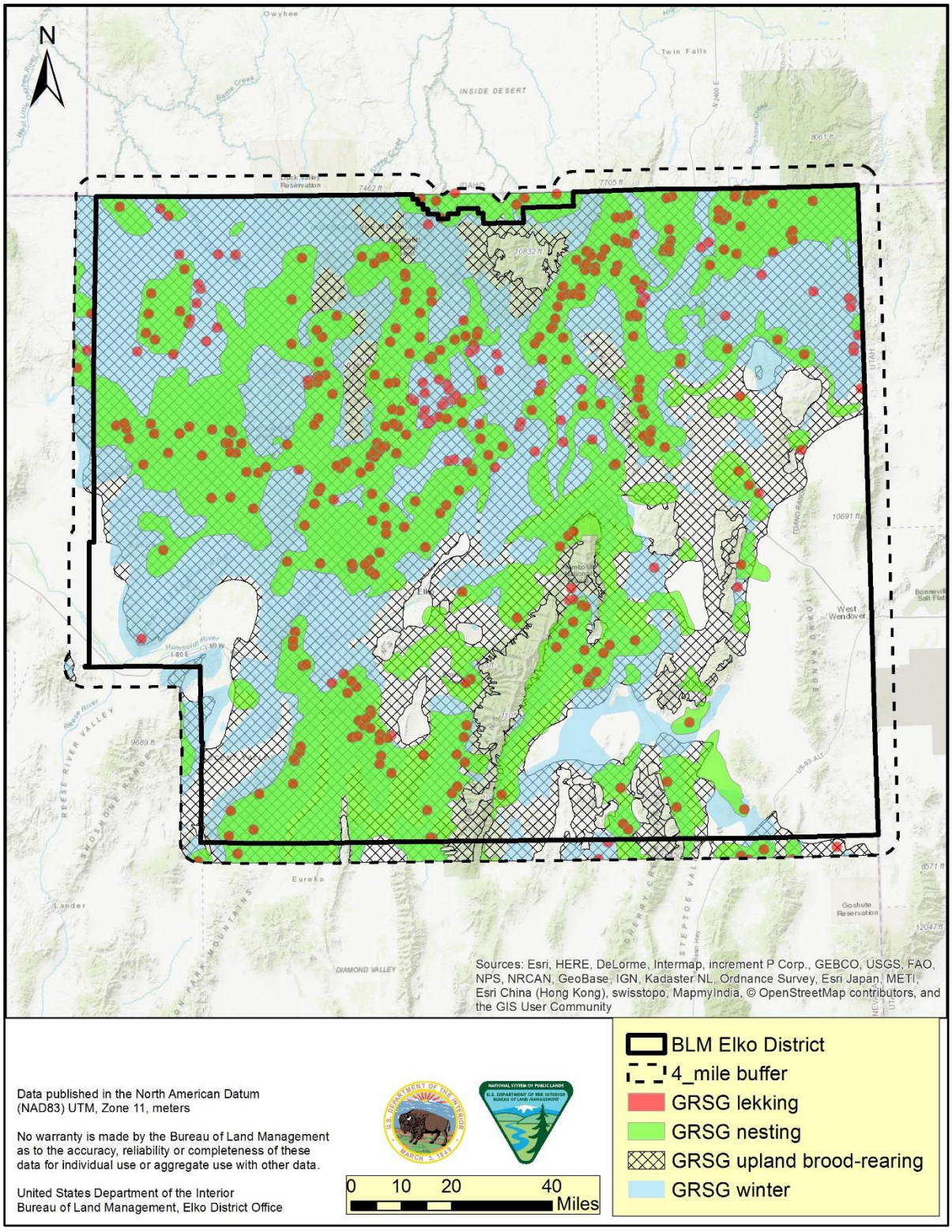
Map 8. Bighorn Sheep Seasonal Habitats



Map 9. Greater Sage-Grouse Habitat Management Categories on BLM-administered Lands

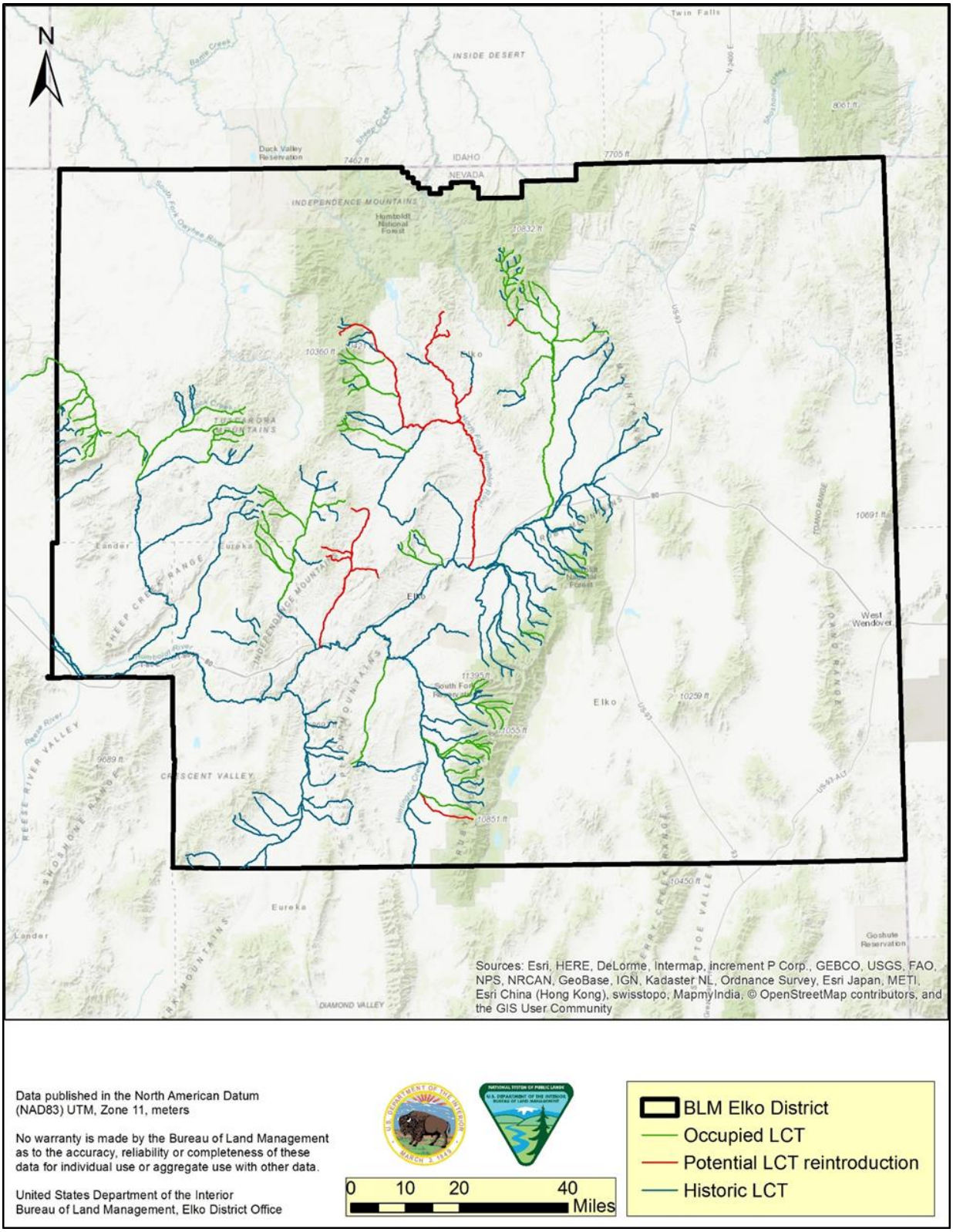


Map 10. Greater Sage-Grouse Seasonal Habitats within Elko District Four-Mile Buffer

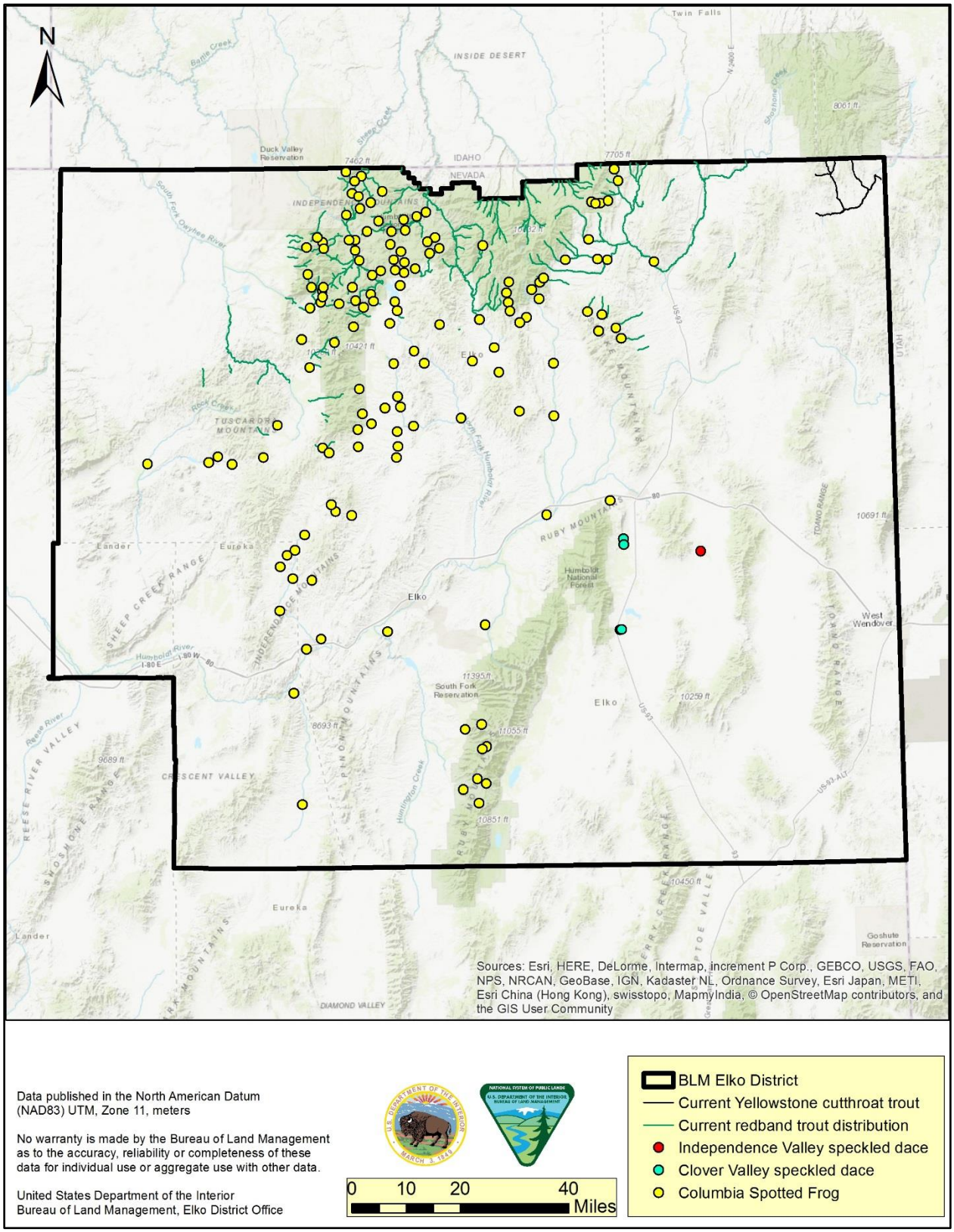


Because habitat management categories were delineated differently in adjacent states (Idaho and Utah), habitat management categories for these areas were not included in this figure.

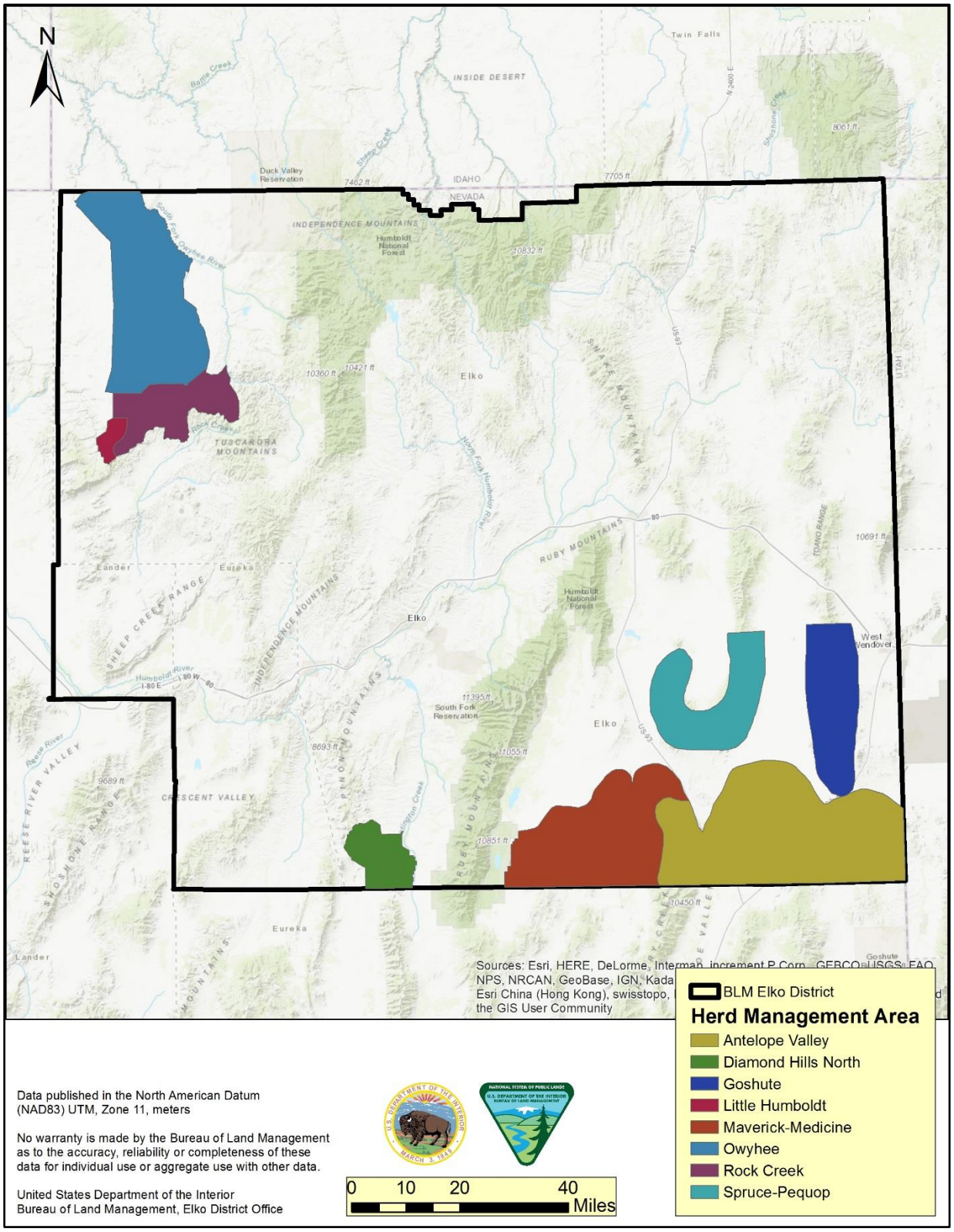
Map 11. Elko District Lahontan Cutthroat Trout Current, Historically Occupied and Potential Reintroduction Streams



Map 12. Elko District Special Status Aquatic Species (excluding LCT)



Map 13. Wild Horse Herd Management Areas



Appendix B. Vertebrate Species List

Vertebrate species (excluding fishes and other aquatic species) that may occur in northeastern Nevada.

Birds

Order: *Gaviiformes* (Diver/Swimmers)
Family: *Gaviidae* (Loons)

Common Loon	*Gavia immer*

Order: *Podicipediformes* (Flat-toed Divers)
Family: *Podicipedidae* (Grebes)

Pied-billed Grebe	*Podilymbus podiceps*
Horned Grebe	*Podiceps auritus*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*

Order: *Pelecaniformes* (Four-toed Fisheaters)
Family: *Pelecanidae* (Pelicans)

American White Pelican	*Pelecanus erythrorhynchos*

Family: *Phalacrocoracidae* (Cormorants)

Double-crested Cormorant	*Phalacrocorax auritus*

Order: *Ciconiiformes* (Long-legged Waders)
Family: *Ardeidae* (Bitterns, Herons, Egrets)

American Bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Cattle Egret	*Bubulcus ibis*
Green Heron	*Butorides virescens*
Black-crowned Night Heron	*Nycticorax nycticorax*

Family: *Threskiornithidae* (Ibises)

White-faced Ibis	*Plegadis chihi*

Family: *Cathartidae* (New World Vultures)

Turkey Vulture	*Cathartes aura*
California Condor	*Gymnogyps californianus(loc.ex)*

Order: *Anseriformes* (Waterfowl)
Family: *Anatidae* (Ducks, Geese, Swans)

Greater White-fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Canada Goose	*Branta canadensis*
Tundra Swan	*Cygnus columbianus*
Trumpeter Swan	*Cygnus buccinator*
Wood Duck	*Aix sponsa*
Gadwall	*Anus strepera*
American Widgeon	*Anus americana*
Mallard	*Anus platyrhynchos*
Blue-winged Teal	*Anas discors*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Anas clypeata*
Northern Pintail	*Anas acuta*
Green-winged Teal	*Anas crecca*
Canvasback	*Aythya valisinaria*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Lesser Scaup	*Aythya affinis*
Bufflehead	*Bucephala albeola*
Common Goldeneye	*Bucephala clangula*
Barrow's Goldeneye	*Bucephala islandica*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Ruddy Duck	*Oxyura jamaicensis*

Order: *Falconiformes* (Diurnal Flesh Eaters)
Family: *Accipitridae* (Hawks, Eagles, Osprey)

Osprey	*Pandion haliaetus*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Northern Goshawk	*Accipiter gentilis*
Red-shouldered Hawk	*Buteo lineatus*
Broad-winged Hawk	*Buteo platypterus*
Swainson's Hawk	*Buteo swainsoni*
Red-tailed Hawk	*Buteo jamaicensis*
Ferruginous Hawk	*Buteo regalis*
Rough-legged Hawk	*Buteo lagopus*
Golden Eagle	*Aquila chrysaetos*

Family: *Falconidae* (Falcons)

American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Gyrfalcon	*Falco rusticolus*
American Peregrine Falcon	*Falco peregrinus*
Prairie Falcon	*Falco mexicanus*

Order: *Galliformes* (Chicken Relatives)
Family: *Phasianidae* (Grouse, Partridge)

Chukar	*Alectoris chukar*
Himalayan Snowcock	*Tetraogallus himalayensis*
Gray Partridge	*Perdix perdix*
Ruffed Grouse	*Bonasa umbellus*
Greater Sage-Grouse	*Centrocercus urophasianus*
Blue Grouse	*Dendragapus obscurus*
C. Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*
Wild Turkey	*Meleagris gallopavo*

Family: *Odontophoridae* (New World Quail)

California Quail	*Callipepla californica*
Mountain Quail	*Oreortyx pictus*

Order: *Gruiformes* (Cranes and Allies)
Family: *Rallidae* (Rails, Coots)

Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
Common Moorhen	*Gallinula chloropus*
American Coot	*Fulica americana*

Family: *Gruidae* (Cranes)

Greater Sandhill Crane	*Grus canadansis tabida*

Order: *Charadriiformes* (Wading Birds)
Family: *Charadriidae* (Plovers)

Black-bellied Plover	*Pluvialis squatarola*
Snowy Plover	*Charadrius alexandrinus*
Semi-palmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Mountain Plover	*Charadrius montanus*

Family: *Recurvirostridae* (Avocets)

Black-necked Stilt	*Himantopus mexicanus*
American Avocet	*Recurvirostra americana*

Family: *Scolopacidae* (Sandpipers, Phalaropes)

Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Spotted Sandpiper	*Actitus macularia*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Western Sandpiper	*Calidris mauri*
Least Sandpiper	*Calidris minutilla*
Baird's Sandpiper	*Calidris bairdii*
Long-billed Dowitcher	*Limnodromnus scolopaceus*
Wilson's Snipe	*Gallinago delicata*
Wilson's Phalarope	*Phalaropus tricolor*
Red-necked Phalarope	*Phalaropus lobatus*

Family: *Laridae* (Gulls, Terns)

Franklin's Gull	*Larus pipixcan*
Bonaparte's Gull	*Larus philadelphia*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Herring Gull	*Larus argentatus*
Caspian Tern	*Sterna caspia*
Forster's Tern	*Sterna forsteri*
Black Tern	*Chlidonias niger*

Order: *Columbiformes* (Pigeons and Allies)
Family: *Columbidae* (Doves)

Rock Dove	*Columba livia*
White-winged Dove	*Zenaida asiatica*
Mourning Dove	*Zenaida macroura*
Eurasian Collared Dove	*Streptopelia decaocto*

Order: *Cuculiformes* (Cuckoos and Allies)
Family: *Cuculidae* (Cuckoos andRoadrunners)

Yellow-billed Cuckoo	*Coccyzus americanus*
Greater Roadrunner	*Geococcyx californianus*

Order: *Strigiformes* (Nocturnal Flesh Eaters)
Family: *Tytonidae* (Barn Owls)

Barn Owl	*Tyto alba*

Family: *Strigidae* (Owls)

Flammulated Owl	*Otus flammeolus*
Western Screech-Owl	*Megascops kennicottii*
Great Horned Owl	*Bubo virginianus*
Burrowing Owl	*Athene cunicularia*
Long-eared Owl	*Asio otus*
Short-eared Owl	*Asio flammeus*
Northern Saw-whet Owl	*Aegolius acadicus*
Northern Pygmy-Owl	*Glaucidium gnoma*

Order: *Caprimulgiformes* (Night Jars)
Family: *Caprimulgidae* (Goatsuckers)

Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*

Order: *Apodiformes* (Small Fast Fliers)
Family: *Apodidae* (Swifts)

White-throated Swift	*Aeronautes saxatalis*

Family: *Trochilidae* (Hummingbirds)

Black-chinned Hummingbird	*Archilochus alexandri*
Calliope Hummingbird	*Stellula calliope*
Broad-tailed Hummingbird	*Selasphorus platycercus*
Rufous Hummingbird	*Selasphorus rufus*

Order: *Coraciiformes* (Cavity Nesters)
Family: *Alcedinidae* (Kingfishers)

Belted Kingfisher	*Ceryle alcyon*

Order: *Piciformes* (Cavity Builders)
Family: *Picidae* (Woodpeckers)

Lewis' Woodpecker	*Melanerpes lewis*
Williamson's Sapsucker	*Sphyrapicus thyroideus*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Three-toed Woodpecker	*Picoides tridactylus*
Northern Flicker	*Colaptes auratus*

Order: *Passeriformes* (Perching Birds)
Family: *Tyrannidae* (Flycatchers)

Olive-sided Flycatcher	*Contopus cooperi*
Western Wood-Pewee	*Contopus sordidulus*
Willow Flycatcher	*Epidonax traillii*
Hammond's Flycatcher	*Epidonax hammondii*
Gray Flycatcher	*Epidonax wrightii*
Dusky Flycatcher	*Epidonax oberholseri*
Cordilleran Flycatcher	*Epidonax occidentalis*
Black Phoebe	*Sayornis nigricans*
Say's Phoebe	*Sayornis saya*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*

Family: *Laniidae* (Shrikes)

Loggerhead Shrike	*Lanius ludovicianus*
Northern Shrike	*Lanius excubitor*

Family: *Vireonidae* (Vireos)

Plumbeous Vireo	*Vireo plumbeus*
Warbling Vireo	*Vireo gilvus*

Family: *Corvidae* (Jays)

Western Scrub-Jay	*Aphelocoma californica*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Clark's Nutcracker	*Nucifraga columbiana*
Black-billed Magpie	*Pica pica*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*

Family: *Alaudidae* (Larks)

Horned Lark	*Eremophila alpestris*

Family: *Hirundinidae* (Swallows)

Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Bank Swallow	*Riparia riparia*
N. Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*

Family: *Paridae* (Chickadees, Titmice)

Black-capped Chickadee	*Poecile atricapillus*
Mountain Chickadee	*Poecile gambeli*
Juniper Titmouse	*Baeolophus griseus*

Family: *Aegithalidae* (Bushtits)

Bushtit	*Psaltriparus minimus*

Family: *Sittidae* (Nuthatches)

Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
Pygmy Nuthatch	*Sitta pygmaea*

Family: *Certhiidae* (Creepers)

Brown Creeper	*Certhia americana*

Family: *Troglodytidae* (Wrens)

Rock Wren	*Salpinctes obsoletus*
Canyon Wren	*Catherpes mexicanus*
Bewick's Wren	*Thyromanes bewickii*
House Wren	*Troglodytes aedon*
Winter Wren	*Troglodytes troglodytes*
Marsh Wren	*Cistothorus palustris*

Family: *Cinclidae* (Dippers)

American Dipper	*Cinclus mexicanus*

Family: *Regulidae* (Kinglets)

Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Redulus calendula*

Family: *Sylviidae* (Gnatcatchers)

Blue-gray Gnatcatcher	*Polioptila caerulea*

Family: *Turdidae* (Thrushes)

Western Bluebird	*Sialia mexicana*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Veery	*Catharus fuscescens*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*

Family: *Turdidae* (Thrushes) (continued)

American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*

Family: *Mimidae* (Thrashers, Mockingbirds)

Northern Mockingbird	*Mimus polyglottos*
Sage Thrasher	*Oreoscoptes montanus*

Family: *Sturnidae* (Starlings)

European Starling	*Sturnus vulgaris*

Family: *Motacillidae* (Pipits)

American Pipit	*Anthus rubescens*

Family: *Bombycillidae* (Waxwings)

Bohemian Waxwing	*Bombycilla garrulus*
Cedar Waxwing	*Bombycilla cedrorum*

Family: *Parulidae* (Wood-Warblers)

Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Virginia's Warbler	*Vermivora virginae*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Gray Warbler	*Dendroica nigrescens*
Townsend's Warbler	*Dendroica townsendi*
MacGillivray's Warbler	*Oporornis tolmiei*
Common Yellowthroat	*Geothlypis trichas*
Wilson's Warbler	*Wilsonia pusilla*
Yellow-breasted Chat	*Icteria virens*

Family: *Thraupidae* (Tanagers)

Western Tanager	*Piranga ludoviciana*

Family: *Emberizidae* (Sparrows, Towhees, Juncos)

Green-tailed Towhee	*Pipilo chlorurus*
Spotted Towhee	*Pipilo maculatus*
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
Brewer's Sparrow	*Spizella breweri*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Black-throated Sparrow	*Amphispiza bileneata*
Sage Sparrow	*Amphispiza belli*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus bairdii*
Fox Sparrow	*Passerella iliaca schistacea*
Song Sparrow	*Melospiza melodia*
Lincoln's Sparrow	*Melospiza lincolnii*
White-throated Sparrow	*Zonotrichia albicollis*
Harris's Sparrow	*Zonotrichia querula*
Gambel'sWhite-crowned Sparrow	*Zonotrichia leucophrys gambelii*
Mountain W-crowned Sparrow	*Zonotrichia leucophrys oriantha*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
Dark-eyed Junco*(Oregon)*	*Junco hyemalis therburi*
Dark-eyed Junco(*Gray-headed*)	*Junco hyemalis caniceps*
Lapland Longspur	*Calcarius lapponicus*

Family: *Cardinalidae* (Grosbeaks, Buntings)

Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Blue Grosbeak	I*raca caerulea*
Lazuli Bunting	*Passerina amoena*
Indigo Bunting	*Passerina cyanea*

Family: *Icteridae* (Blackbirds, Orioles)

Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Great-tailed Grackle	*Quiscalus mexicanus*
Brown-headed Cowbird	*Molothrus ater*

Family: *Icteridae* (Blackbirds, Orioles continued)

Bullock's Oriole	*Icterus bullockii*
Scott's Oriole	*Icterus parisorum*

Family: *Fringillidae* (Finches, Grosbeaks)

Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Black Rosy-Finch	*Leucosticte atrata*
Pine Grosbeak	*Pinicola enucleator*
Purple Finch	*Carpodacus purpureus*

Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Red Crossbill	*Loxia curvirostra*
Common Redpoll	*Carduelis flammea*
Pine Siskin	*Carduelis pinus*
Lesser Goldfinch	*Carduelis psaltria*
American Goldfinch	*Carduelis tristis*
Evening Grosbeak	*Coccothraustes vespertinus*

Family: *Passeridae* (Old World Sparrows)

House Sparrow	*Passer domesticus*

Mammals

Order: *Insectivora* (Insect Eaters)

Family: *Soricidae* (Shrews)

Merriam's Shrew	*Sorex meriammi*
Dusky Shrew	*Sorex monticolus*
Vagrant Shrew	*Sorex vagrans*
Water Shrew	*Sorex palustris*
Preble's Shrew	*Sorex preblei*

Order: *Chiroptera* (Bats)

Family: *Vespertilionidae* (Plainnose Bats)

California Myotis	*Myotis californicus*
Small-footed Myotis	*Myotis ciliolabrum*
Long-eared Myotis	*Myotis evotis*
Little Brown Bat	*Myotis lucifugus*
Fringed Myotis	*Myotis thysanodes*
Long-legged Myotis	*Myotis volans*
Yuma Myotis	*Myotis yumanensis*
Western Red Bat	*Lasiurus blossvellii*
Hoary Bat	*Lasiurus cinereus*
Silver-haired Bat	*Lasionycteris noctivagans*
Western Pipistrelle	*Pipistrellus hesperus*
Big Brown Bat	*Eptesicus fuscus*
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Spotted Bat	*Euderma maculata*
Pallid Bat	*Antrozous pallidus*

Family: *Molossidae* (Freetail Bats)

Brazilian Free-tailed Bat	*Tadarida brasiliensis*

Order: *Lagomorpha* (Pikas, Hares, Rabbits)

Family: Ochotonidae (Pikas)

Pika	*Ochotona princeps*

Family: *Leporidae* (Hares, Rabbits)

White-tailed Jackrabbit	*Lepus townsendi*
Snowshoe Hare	*Lepus americanus*
Black-tailed Jackrabbit	*Lepus californicus*
Mountain Cottontail	*Sylvilagus nuttalli*
Pygmy Rabbit	*Brachylagus idahoensis*

Order: *Rodentia* (Rodents)

Family: *Sciuridae* (Squirrels)

Least Chipmunk	*Tamias minimus*
Cliff Chipmunk	*Tamias dorsalis*
Uinta Chipmunk	*Tamias umbrinus*
Yellow-bellied Marmot	*Marmota flaviventris*
White-tailed Antelope Squirrel	*Ammospermophilus leucurus*
Townsend Ground Squirrel	*Spermophilus townsendii*
Belding Ground Squirrel	*Spermophilus beldingi*

Family: *Geomyidae* (Gophers)

Botta's Pocket Gopher	*Thomomys bottae*
Northern Pocket Gopher	*Thomomys talpoides*
Southern Pocket Gopher	*Thomomys umbrinus*

Family: *Heteromyidae* (Kangaroo Rodents)

Little Pocket Mouse	*Perognathus longimembris*
Great Basin Pocket Mouse	*Perognathus parvus*
Dark Kangaroo Mouse	*Microdipodops megacephalus*
Ord's Kangaroo Rat	*Dipodomys ordii*
Chisel-toothed Kangaroo Rat	*Dipodomys microps*

Family: *Castoridae* (Beavers)

Beaver	*Castor canadensis*

Family: *Cricetidae* (Mice, Rats, Voles)

Western Harvest Mouse	*Reithrodontomys megalotis*
Canyon Mouse	*Peromyscus crinitus*
Deer Mouse	*Peromyscus maniculatus*
Pinion Mouse	*Peromyscus truei*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Desert Woodrat	*Neotoma lepida*
Bushy-tailed Woodrat	*Neotoma cinerea*
Mountain Vole	*Microtus montanus*
Long-tailed Vole	*Microtus longicaudus*
Sagebrush Vole	*Lemmiscus curtatus*
Muskrat	*Ondatra zibethica*

Family: *Zapodidae* (Jumping Mice)

Western Jumping Mouse	*Zapus princeps*

Family: *Erethizontidae* (New World Porcupines)

Porcupine	*Erethizon dorsatum*

Order: *Carnivora* (Flesh-Eaters)

Family: *Canidae* (Dogs, Wolves, Foxes)

Coyote	*Canis latrans*
Gray Wolf	*Canis lupus* (*locally extirpated*)
Gray Fox	*Urocyon cinereoargenteus*
Kit Fox	*Vulpes macrotus*
Red Fox	*Vulpes vulpes*

Family: *Procyonidae* (Racoons and Allies)

Raccoon	*Procyon lotor*

Family: *Mustelidae* (Weasels and Allies)

Short-tailed Weasel	*Mustela erminae*
Long-tailed Weasel	*Mustela frenata*

Family: *Mustelidae* (Weasels and Allies) (cont.)

Mink	*Mustela vison*
American Marten	*Martes americana (l. extirpated)*
Wolverine	*Gulo gulo (locally extirpated)*
River Otter	*Lutra canadensis*
American Badger	*Taxidea taxus*
Striped Skunk	*Mephitis mephitis*
Western Spotted Skunk	*Spilogale gracilis*

Family: *Felidae* (Cats)

Mountain Lion	*Felix concolor*
Lynx	*Lynx lynx (locally extirpated)*
Bobcat	*Lynx rufus*

Order: *Artiodactyla* (Hoofed Mammals)
Family: *Cervidae* (Deer)

Rocky Mountain Elk	*Cervus elaphus*
Mule Deer	*Odocoileus hemionus*

Family: *Antilocapridae* (Pronghorn)

Pronghorn	*Antilocapra americana*

Family: *Bovidae* (Bison, Sheep, Goats)

Bison	*Bison bison (locally extirpated)*
Mountain Goat	*Oreamnos americanus*
Bighorn Sheep	*Ovis canadensis*

Reptiles
Order: *Squamata* (Lizards, Snakes)
Family: *Iguanidae* (Iguanas and Allies)

Western Fence Lizard	*Sceloporus occidentalis*
Sagebrush Lizard	*Sceloporus graciosus*
Side-blotched Lizard	*Uta stansburiana*
Pigmy Short-horned Lizard	*Phrynosoma douglassii*
Greater Short-horned Lizard	*Phrynosoma hernadesi*
Desert Horned Lizard	*Phrynosoma platyrhinos*

Family: *Scincidae* (Skinks)

Western Skink	*Eumeces skiltonianus*

Family: *Teiidae* (Whiptails)

Western Whiptail	*Cnemidophorus tigrus*

Family: *Boidae* (Boas, Pythons)

Rubber Boa	*Charina bottae*

Family: *Colubridae* (Solid-toothed Snakes)

Ringneck Snake	*Diadophis punctatus*
Striped Whipsnake	*Masticophis taeniatus*
Great Basin Gopher Snake	*Pituophis cantenifer deserticola*
Common Kingsnake	*Lampropeltis getulus*
Sonoran Mountain Kingsnake	*Lampropeltis pyromelana*
Long-nosed Snake	*Rhinocheilus lecontei*
Western Terrestrial Garter	*Thamnophis elegans*
Ground Snake	*Sonora semiannulata*
Night Snake	*Hypsiglena torquata*

Family: *Viperidae* (Vipers)

Great Basin Rattlesnake	*Crotalus oreganus lutosus*

Amphibians
Order: *Anura* (Frogs and Toads)
Family: *Pelobatidae* (Spadefoots)

Great Basin Spadefoot Toad	*Scaphiopus intermontanus*

Family: *Ranidae* (True Frogs)

Columbia Spotted Frog	*Rana luteiventris*
Northern Leopard Frog	*Rana pipiens*
Bullfrog	*Rana catesbeiana*

Family: *Bufonidae* (Toads)

Western Toad	*Bufo boreas*

Family: *Hylidae* (Treefrogs)

Pacific Treefrog	*Hyla regilla*

Note: This list is a combination of wildlife sight record data and our best effort to predict what wildlife species live in this area in all seasons and under optimum habitat conditions.

*With the exception of the European Starling, House Sparrow, Eurasian Collared Dove, and Rock Dove, all birds are protected in Nevada by either the International Migratory Bird Treaty Act or as game species. Several mammal and one amphibian species are also protected as game species.

Updated: 4/2005 - Peter V. Bradley - Nevada Department of Wildlife - Elko, Nevada.

Appendix C. Water Resources Not Meeting Beneficial Use Criteria

Seventy-one rivers and streams within EDO assessed in the most recent 2014 report are on Nevada's 303(d) list of impaired waters (NDEP 2016). These 71 rivers and streams comprise 1,399 miles and are listed below in Table 13. Eight of 12 lakes, reservoirs, wetlands, and ponds assessed by NDEP in the 2014 report were not meeting all beneficial use criteria (NDEP 2016). These eight lakes, reservoirs, and ponds comprise 19,437 acres and are listed in Table 14.

Table 13. Elko District Rivers and Streams Not Attaining Beneficial Use Criteria

River/Stream	Beneficial Use	Exceedance
Badger Creek	Aquatic Life	Iron
Beadles Creek	Aquatic Life	pH
Beaver Creek	Aquatic Life	Temperature
Beaver Creek, East Fork	Aquatic Life	Temperature
Beaver Creek, West Fork	Aquatic Life	Phosphorus, Temperature
Bruneau River	Aquatic Life	Temperature
Burns Creek	Municipal Domestic Supply	Sulfates, Total Dissolved Solids
Cabin Creek	Aquatic Life	Zinc, Temperature
Cabin Creek	Aquatic Life	Temperature
Cedar Creek	Recreation with Water Contact	E. Coli
Cole Creek	Propagation of Wildlife	pH
Conners Creek	Aquatic Life	Phosphorus, Temperature
Cottonwood Creek	Aquatic Life	Temperature
Cottonwood Creek, North Fork	Aquatic Life	Temperature
Deer Creek	Aquatic Life	Temperature
Deer Creek, West Fork	Aquatic Life	Temperature
Dixie Creek	Aquatic Life, Recreation with Water Contact	E. Coli, Iron, Phosphorus
Dry Creek	Aquatic Life	Cadmium, Copper, Iron, Zinc, Temperature, Turbidity
Dry Creek	Aquatic Life, Municipal Domestic Supply	Nickel, Selenium, Total Dissolved Solids
Emigrant Spring Drainage	Aquatic Life	Iron, Phosphorus
Gracie Creek	Municipal Domestic Supply	Sulfates, Total Dissolved Solids
Hanks Creek	Aquatic Life	Temperature
Humboldt River	Aquatic Life, Fish Consumption	Iron, Mercury in Fish Tissue, Phosphorus, Turbidity
Humboldt River, North Fork	Aquatic Life, Irrigation, Municipal Domestic Supply	Iron, Manganese, Phosphorous, pH, Temperature, Total Dissolved Solids
Humboldt River, South Fork	Fish Consumption	Mercury in Fish Tissue
Huntington Creek	Aquatic Life, Municipal Domestic Supply	Phosphorus, Total Dissolved Solids

River/Stream	Beneficial Use	Exceedance
Jakes Creek	Aquatic Life	Temperature, Turbidity
Jakes Creek, North Fork	Aquatic Life	Temperature, Total Suspended Solids, Turbidity
Jakes Creek, South Fork	Aquatic Life	Temperature
Jarbidge River, East Fork	Aquatic Life	Temperature
Jerritt Canyon Creek	Municipal Domestic Supply	Sulfates, Total Dissolved Solids
Little Goose Creek	Aquatic Life	pH, Temperature, Total Suspended Solids, Turbidity
Little Humboldt River, South Fork	Aquatic Life, Recreation with Water Contact	E. Coli, Iron, Phosphorus, Temperature
Little Porter Creek	Aquatic Life	Phosphorus
Maggie Creek	Aquatic Life	Phosphorus, Temperature
Marys River	Aquatic Life	Dissolved Oxygen, Temperature
Mill Creek	Aquatic Life, Irrigation, Municipal Domestic Supply	Iron, Manganese, Nickel, Sulfates, Zinc,
Mill Creek	Aquatic Life, Irrigation, Municipal Domestic Supply	Phosphorus, Sulfates, Total Dissolved Solids, Total Suspended Solids
Mosquito Canyon Creek	Aquatic Life, Municipal Domestic Supply	Iron, Manganese, Selenium, Sulfates, Total Dissolved Solids
North Antelope Creek	Aquatic Life	Iron
Owyhee River	Fish Consumption	Mercury in Fish Tissue
Owyhee River, South Fork	Aquatic Life, Fish Consumption	Iron, Mercury in Fish Tissue, Phosphorus, Temperature
Pearl Creek	Aquatic Life	Temperature
Peterson Creek	Aquatic Life	pH
Pine Creek	Aquatic Life, Municipal Domestic Supply	Phosphorus, Total Dissolved Solids
Pratt Creek	Aquatic Life	pH
Rio Tinto Gulch	Aquatic Life, Irrigation	Manganese, Zinc
Robinson Creek	Aquatic Life	Temperature
Salmon Falls Creek	Aquatic Life	Iron, Phosphorus, Temperature, Total Suspended Solids, Turbidity
Salmon Falls Creek, South Fork	Aquatic Life	Temperature
Sammy Creek	Aquatic Life, Municipal Domestic Supply	Arsenic, Selenium, pH, Total Dissolved Solids
Sheep Creek	Aquatic Life, Municipal Domestic Supply	Nickel, Phosphorus, Selenium, Total Dissolved Solids
Sherman Creek	Aquatic Life, Recreation with Water Contact	E. Coli, Iron, Phosphorus
Shoshone Creek	Aquatic Life	Temperature
Snow Canyon Creek	Municipal Domestic Supply	Sulfates, Total Dissolved Solids
Snow Canyon Creek, East Fork	Aquatic Life, Municipal Domestic Supply	Selenium, Sulfates, Total Dissolved Solids

River/Stream	Beneficial Use	Exceedance
Starvation Canyon Creek	Aquatic Life	Phosphorus, Total Suspended Solids
Stormy Creek	Municipal Domestic Supply	Total Dissolved Solids
Sun Creek	Aquatic Life	Temperature
Tabor Creek	Aquatic Life, Irrigation, Recreation with Water Contact	E. Coli, Cadmium, Nickel, Selenium, Zinc
Taylor Canyon	Aquatic Life	Phosphorus
Tenmile Creek	Aquatic Life, Recreation with Water Contact	E. Coli, Iron, Phosphorus, Temperature
Tomasina Gulch	Aquatic Life, Irrigation	Arsenic, Iron, Manganese
Trout Creek (Snake River Basin)	Aquatic Life, Recreation with Water Contact	E. Coli, Iron, Phosphorus, Temperature, Turbidity
Trout Creek (Snake River Basin)	Aquatic Life	Iron, Temperature
Trout Creek (Humboldt River Basin)	Propagation of Wildlife	pH
Trout Creek, West Fork	Aquatic Life	Phosphorus, Total Suspended Solids, Turbidity
Water Canyon Creek	Aquatic Life, Municipal Domestic Supply	Selenium, pH, Total Dissolved Solids
Willow Creek	Aquatic Life	Temperature
Willow Creek	Municipal Domestic Supply	Total Dissolved Solids
Woodruff Creek	Aquatic Life	Phosphorus, Total Suspended Solids, Turbidity

Table 14. Elko District Lakes, Reservoirs, Wetlands and Ponds Not Attaining Beneficial Use Criteria

Lake/Reservoir/Wetland/Pond	Beneficial Use	Exceedance
Barth Pit	Fish Consumption	Mercury in Fish Tissue
Jakes Creek Reservoir	Fish Consumption	Mercury in Fish Tissue
Overland Lake	Fish Consumption	Mercury in Fish Tissue
Ruby Marsh	Aquatic Life, Fish Consumption	Mercury in Fish Tissue
South Fork Reservoir	Aquatic Life, Fish Consumption	Mercury in Fish Tissue, Temperature
Warm Springs Pond	Fish Consumption	Mercury in Fish Tissue
Wildhorse Reservoir	Aquatic Life, Fish Consumption	Mercury in Fish Tissue, Dissolved Oxygen, pH, Phosphorus, Temperature
Willow Creek Reservoir	Aquatic Life, Irrigation	Iron, Manganese, Phosphorus