

Draft Environmental Assessment

Grazing at Ruby Lake National Wildlife Refuge

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Prepared by Ruby Lake National Wildlife Refuge



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Chapter 1: Introduction

1.1 Background

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System, the purposes of an individual refuge, federal laws and executive orders, U.S. Fish and Wildlife Service policy, and international treaties. Relevant guidance includes but is not limited to the National Wildlife Refuge Administration Act of 1966, as amended (Administration Act, 16 United States Code [U.S.C.] 668dd et seq.); the Refuge Recreation Act of 1962; and selected portions of the CFR and the U.S. Fish and Wildlife Service manual.

The mission of the National Wildlife Refuge System, as outlined by the National Wildlife Refuge System Administration Act of 1966, as amended is:

“to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The Administration Act directs the Secretary of the Department of the Interior to ensure that refuges are fulfilling the intended mission of the refuge system and the purposes of individual refuges (16 U.S.C. 668dd(5)(a)(3)(A-M)).

Ruby Lake National Wildlife Refuge was established in 1938 “...for use as...a refuge and breeding ground for migratory birds and other wildlife.” (Executive Order 7923, July 2, 1938). Additional refuge purposes, established through expansion of the refuge, include:

“... for use as inviolate sanctuaries for migratory birds...” 16 U.S.C. § 715d (Migratory Bird Conservation Act of 1929)

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929, as amended)

"...to provide for the management, protection, development, and enhancement of public lands..." (Federal Land Policy and Management Act of 1976 (43 U.S.C. 1716), as amended.

Grazing was conducted in the Ruby Lake Area for many years, both before and after refuge establishment. Like many areas of the American West, Ruby Valley had extensive uncontrolled grazing of cattle, sheep, and horses from the mid- to late 1800s to the early 1900s (Patterson et al. 1991). After many years of overgrazing, refuge resources were degraded and, since refuge establishment, there have been efforts to review the refuge’s grazing program and provide recommendations to prevent future resource degradation (USFWS 1996; Simonds 2018). The amount of grazing on the refuge has varied. Between 2005 and 2020, an average of approximately 3,200 acres were grazed each year. In 2021, a grazing cooperator was selected

but decided not to graze on the refuge. No grazing has occurred since then, in lieu of other management tools such as fire, herbicide, and mechanical control, and due to concerns about the effects of grazing, including soil disturbance that can cause increased prevalence of invasive plant species, overgrazing of meadows and sagebrush communities, and direct and indirect impacts to wildlife (USFWS 2022). Livestock grazing on the refuge has been requested by members of the local community. As it is described in this document, grazing is being proposed as a tool to manage vegetation and improve habitat for wildlife in a limited area of refuge meadow, where adverse effects can be minimized.

1.2 Purpose and Need for Action

The purpose of the proposed action is to include prescribed grazing as a tool to manage vegetation within a specified area of Ruby Lake NWR. Grazing has occurred on the refuge in the past (between 2005 and 2020, an average of approximately 3,200 acres were grazed each year); however, degraded resource conditions, the availability of alternate management tools, limited funding and staff, and lack of interest from grazing cooperators led to the cessation of grazing on the refuge in 2021. Recommendations provided in reviews of the refuge's grazing program and habitat management have been considered in developing this proposed action (USFWS 1996; Simonds 2018).

Portions of the refuge meadow are thickly vegetated and lack structural diversity. These conditions limit the quality and availability of wildlife habitat, including nesting and foraging areas. In addition to prescribed burning and mechanical management, targeted grazing assists in reducing excessive vegetation biomass and creating a mosaic of vegetation heights, including short stubble vegetation in grazed areas, that improve habitat suitability for various migratory bird species. Species that benefit from lower-stature or sparser vegetation, such as northern pintail, curlews, killdeer, and willets, occur on the refuge. Marbled godwit is an occasional migrant that may also use similar habitat conditions. Providing high-quality nesting and foraging sites in proximity to refuge wetlands may benefit migratory birds, and a diverse habitat base is important to meet various needs of waterfowl (USFWS 1988). Like prescribed burning and mechanical management, prescribed grazing may also promote new plant growth and arthropod diversity, which provide important forage for wildlife (Goosey et al. 2019).

A suite of tools is often used to manage vegetation, including mechanical treatment (i.e., mowing), herbicides, livestock grazing, and others. The best tool available may be dependent on specific circumstances. A variety of factors may influence decisions about appropriate management tools, including size of the treatment area, terrain, availability of staff and resources, and other environmental conditions. There are limitations of each vegetation management tool that must be considered. For example, some mechanical treatments such as mowing may not be feasible in rocky or steeply sloped environments; herbicide use requires intensive effort and may not be feasible to treat large areas; prescribed fire requires qualified

staff and logistics can be challenging; livestock grazing requires careful consideration of conditions to avoid adverse impacts to sensitive resources. Including livestock grazing as a management tool at Ruby Lake National Wildlife Refuge would expand the suite of tools available to manage vegetation, which could allow staff to select the most suitable management method based on current circumstances.

Although plant communities in the Basin and Range physiographic region evolved in the absence of grazing by large herding ungulates, grazing can be used as a vegetation manipulation tool when used for specific and planned management purposes. The key to the successful use of grazing to manipulate vegetation is control of seasonality, intensity, duration, and the prevention of grazing in plant communities sensitive to disturbance. Currently, a limited area of refuge meadow (approximately 414 acres) has been identified as a location where grazing may be a beneficial management strategy to provide improved wildlife habitat conditions while minimizing adverse effects. The effects of implementing grazing within this area are addressed in this environmental assessment.

The Service may enter into a Cooperative Agricultural Agreement on refuge lands when the use is found to be appropriate and compatible, in accordance with Service procedures described in 603 FW 1 and 603 FW 2, respectively; when it is described as a management action in an approved plan, complies with NEPA and other applicable laws and regulations, and sets explicit objectives related to biological outcomes the Service desires to meet wildlife or habitat management objectives; and when we cannot meet our resource management objectives through maintenance, management, or mimicking of natural ecosystem processes or functions of the particular NWRS land area in compliance with 601 FW 3. A 1994 Compatibility Determination found that grazing was compatible at Ruby Lake NWR. In accordance with Service policy 603 FW 2.11H, thirty years of ongoing scientific and technological developments, and changes in environmental conditions drive the need for a revised assessment of the refuge use. A Finding of Appropriateness and updated Compatibility Determination would be completed before grazing would be implemented on the refuge, as described in the proposed action. Grazing was described as a management action for the Refuge in the approved Habitat Management Plan for Ruby Lake National Wildlife Refuge (USFWS 1981). Strategies, goals, and objectives related to grazing and management of refuge meadows have been adapted over time in various refuge documents (e.g., USFWS 1981; USFWS 1994; USFWS 2003), based on resource needs and grazing/habitat reviews on the refuge (USFWS 1996; Simonds 2018). Objectives related to biological outcomes for the proposed action are included in this document.

To allow for prescribed grazing, the proposed action would meet long-standing Refuge objectives (USFWS 1994) related to wildlife habitat quality, including

- Providing high-quality habitat for the production and/or maintenance of sensitive species, including sandhill cranes.
- Providing and enhancing feeding habitat for migratory waterfowl.
- Providing and enhancing feeding habitat needed for colonial nesting species and other waterbirds.
- Providing diverse, high-quality upland and wetland habitats for molting and migrating waterfowl.
- Protecting and enhancing important wildlife resources under principles of good land stewardship.

Additionally, Refuge-wide habitat objectives from the Sagebrush and Salt Desert Scrub Ecosystem Management Plan (USFWS 2022) inform the design of this proposed grazing program, including improving perennial grasses and forbs and maintaining the status of annual grasses to achieve desired future habitat conditions (e.g., more than 15% perennial grass cover, at least 4 perennial grass species, more than 10% forb cover, 9 or more forb species, less than 5% annual grasses). Grazing intensity and timing would be adapted, as needed, to support achievement of these biological outcomes.

1.3 Proposed Action

The U.S. Fish and Wildlife Service proposes to offer prescribed livestock grazing with cattle on approximately 414 acres of meadow (Figure 1) within Ruby Lake NWR. The proposed action supports achievement of Refuge objectives related to grazing, described in the 1994 EA for grazing at Ruby Lake NWR (USFWS 1994), by applying grazing in a manner that supports vegetation manipulation goals and improves wildlife habitat conditions.

A proposed action is an initial proposal and may evolve during the development of alternatives, the impact analysis, and public involvement. The lead federal agency may determine that there are other, better, or less impactful ways to address the purpose and need, resulting in a different preferred alternative. The proposed action and alternatives may evolve during the NEPA process as the USFWS refines its proposal and gathers feedback from the public, federally recognized tribes and tribal entities, and other agencies or organizations. Therefore, the final proposed action may be different from the original. The proposed action will only be finalized at the conclusion of the public comment period after the incorporation of substantive comments. A decision to implement a proposed action will not be made until the environmental review process is complete.



Figure 1. Proposed grazing unit at Ruby Lake National Wildlife Refuge.

Chapter 2: Alternatives

2.1 Decision Framework

Following completion of the EA, the U.S Fish and Wildlife Service Region 8 Assistant Regional Director, Refuges will 1) select the alternative to implement, and 2) determine if the selected alternative is a major federal action that would significantly affect the quality of the human environment and require preparation of an environmental impact statement or, alternatively, determine there would be no significant effects to the human environment and complete a Finding of No Significant Impact (FONSI).

2.2 Alternatives

Alternative A – Current Management - No Action Alternative

Currently, grazing is not implemented on Ruby Lake NWR. Under Alternative A (no action alternative), current management would continue and grazing would not be permitted on the refuge. Other tools, such as prescribed fire, mechanical control, and herbicide, would continue to be used to manage vegetation in targeted areas, but prescribed grazing would not be considered as a tool to address excessive biomass or structural diversity needs identified in **Section 1.3, Purpose and Need for Action**.

Alternative B – Implement Grazing in Refuge Meadows

Under Alternative B, Ruby Lake NWR would provide a cooperative agricultural opportunity by offering grazing within approximately 414 acres of refuge meadow (Figure 1). Grazing would occur within the dry meadow community. Aquatic habitats, riparian areas, and other sensitive locations (e.g., important wildlife areas) would be excluded from the area proposed for grazing. Livestock operators would provide water and use virtual fencing to contain cattle within the designated grazing unit. Temporary fencing may also be authorized at the discretion of refuge staff. Stocking rates would be determined by considering the guideline for appropriate utilization to “take half and leave half”, or to utilize 50% of annual forage production, including both forage consumed and damage caused by trampling, loafing, and other livestock-related factors (NRCS 2009). Fall grazing would be implemented at the discretion of the Refuge Manager and based on current resource conditions. Grazing cooperators would be selected through an open and competitive process and would operate under a Cooperative Agricultural Agreement (CAA), which would last up to five years (620 FW 2.11).

This alternative would implement prescribed grazing as a vegetation management tool to reduce excessive biomass and promote a mosaic of vegetation heights that improves habitat suitability for priority wildlife species. Grazing intensity and timing would be applied in a

manner consistent with Refuge habitat objectives and desired biological outcomes described in **Section 1.3, Purpose and Need for Action.**

Grazing would involve the use of a variety of equipment and infrastructure on the Refuge, potentially including trucks, trailers, off-road vehicles, horses, dogs, loading/unloading ramps, corrals, water pumps, off-stream watering facilities, virtual fencing towers, temporary fencing; and the personnel to operate machinery and manage livestock. Ranching personnel would be on site as needed throughout the season to manage livestock and perform appropriate ranching-related functions, including providing and positioning watering facilities and mineral blocks, operating equipment, checking livestock, and assessing vegetation conditions. Some of this equipment could be on the Refuge throughout the grazing season.

Whether grazing is offered in any given year, the actual acreage offered for grazing each year, and timing are dependent on resource conditions (e.g., current and likely future habitat conditions; wildlife needs; availability of adequate funding, staff, and equipment; air quality restrictions; availability of local ranchers and livestock; forage quality; site conditions, such as access, infrastructure, and fire potential and history) and the Refuge Manager's discretion. In years when permitted, grazing would be allowed between August and December, at the discretion of the Refuge Manager. Animal unit months (AUMs) would be determined annually, based on wildlife habitat needs, vegetation/residual dry matter conditions, precipitation levels/drought, wildfire-related concerns, or at the discretion of the Refuge Manager. These determinations would be made to ensure grazing contributes positively to the Refuge's habitat goals and does not adversely affect sensitive resources. The area considered for grazing in Alternative B was determined using biological monitoring data, known locations of sensitive resources and aquatic resources, previous grazing analyses on Ruby Lake NWR, and the best professional judgment of Service staff.

The following best management practices (BMPs) will be implemented as part of the proposed action:

- **Cooperative Agricultural Agreement:** Livestock operators would be authorized to graze on the Refuge through issuance of a Cooperative Agricultural Agreement. Renewals would be contingent upon compliance with stipulations identified by the refuge, general and special conditions of the special use permit, and the results of monitoring data demonstrating the value of the grazing program for target habitats and wildlife.
- **Protection of Cultural Resources:** In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the disturbance of archaeological or historical sites, and the removal of artifacts are prohibited. The excavation, disturbance, collection, or purchase of historical, ethnological, or archaeological specimens or artifacts, or mementos from the Refuge is prohibited. Livestock operators would not disturb and are

prohibited from collecting and removing archaeological or historic artifacts, abiotic or biological specimens or samples, or mementos from the Refuge.

- **Limits on Grazing Timeframe:** Generally, livestock operators would be authorized to graze on the Refuge from August 1 through December 31 through the prescribed grazing program. The Refuge Manager would reserve the right to alter the dates that grazing is initiated and terminated, alter the area in which grazing would be permitted in any given year, or to not issue grazing permits during some years based upon biological needs, precipitation levels/drought, wildfire-related concerns, staffing levels, or at the discretion of the Refuge Manager.
- **Prevent Spread of Invasive Plants:** Livestock operators would be required, at the discretion of the Refuge Manager, to put livestock used in the Refuge grazing program on weed-free feed for at least 72 hours prior to letting them on the Refuge. Additionally, prior to arrival on the Refuge, livestock operators would be required, at the discretion of the Refuge Manager, to clean all vehicles, machinery, and other equipment of non-native plant and animal matter.
- **Speed Limit:** While on the Refuge, personnel would be required to travel no more than 35 mph (unless otherwise posted), including movement of grazing-related equipment.
- **Virtual Fencing:** Livestock operators would ensure that grazing livestock are appropriately confined to identified areas/pastures using virtual fencing. Some temporary fencing may be authorized at the discretion of Refuge staff. Operators would be responsible for ensuring that livestock are not allowed to roam across the Refuge or onto neighboring lands outside of the identified grazing area, nor are able to access sensitive streams and springs. Operators would be responsible for locating and removing livestock that stray from identified grazing areas (elsewhere on the Refuge or on adjacent lands) within 24 hours of notification by Refuge staff and for properly monitoring and maintaining virtual and temporary fencing. Operators would be responsible for removing temporary fencing at the end of each grazing season.
- **Livestock Monitoring:** Livestock would be checked by the operator every third day at a minimum or more frequently, at the Refuge Manager's discretion.
- **Grazing Limitations:** No more than 50% of available forage would be utilized, including both forage consumed and damage caused by trampling, loafing, and other livestock-related factors. Plants, especially native perennial grasses, would be grazed leaving at least a four-inch stubble height. Operators would be responsible for monitoring vegetation conditions during the grazing season to ensure that these limitations are not exceeded.
- **Fertilizers, Pesticides, and Biological Controls:** Livestock operators would be prohibited from applying fertilizers, pesticides (including fungicides, herbicides, and insecticides), or biological controls on Refuge lands or waters. If, during the Refuge grazing period, there is a substantial outbreak of flies or other livestock pests, ranchers would be

responsible for providing all information necessary to submit an accurate and complete pesticide use proposal (PUP) to the Service for consideration. Control actions would be prohibited until the Service approves the PUP. If the PUP is approved, the operator would be responsible for documenting the amount of active ingredient applied and acres treated, and any other required information, and would report this information to the Service. The operator would be responsible for obtaining and maintaining all necessary certifications required for pesticide application.

- **Predator-Control:** Livestock operators would be prohibited from conducting predator-control activities on the Refuge.
- **Animal Limitations:** Livestock operators would be prohibited from bringing other animals and pets onto the Refuge, with the exception of dogs and horses used in managing livestock; guard animals; and legitimate, leashed guide/service animals. All other pets must remain contained in a vehicle.
- **Water Resources Protection:** Livestock use would not be permitted within at least 100 feet on either side of a known water body or wetland, to protect water quality and riparian resources.
- **Habitat Assessment:** Refuge habitat assessment surveys would be implemented in the grazing unit, to monitor condition and ensure that resources are not being degraded. The survey would measure species and growth forms and would estimate percent cover. Additional productivity surveys may be implemented as needed to inform utilization and stocking rates.

Alternatives Considered but Dismissed (if applicable)

Reasonable alternatives are those alternatives which are technically and economically feasible and meet the purpose and need for the proposed action. Implementing grazing beyond the extent described in Alternative B (for example, more extensive grazing configurations that have been implemented historically) is not technically or economically feasible for Ruby Lake National Wildlife Refuge. Additionally, grazing in vegetation types not described in the proposed action is not expected to provide benefit to refuge ecosystems or contribute to meeting the refuge's purposes.

Monitoring Applicable to All Alternatives

Under all alternatives, regular refuge monitoring (including invasive species monitoring and wildlife monitoring) would continue, which would allow staff to assess refuge resource status. Additionally, habitat assessment surveys would continue across the Refuge, which measure species and growth forms, and estimate percent cover. Monitoring may be adjusted, or additional surveys may be conducted as needed within the proposed grazing unit, based on the selected alternative.

Chapter 3: Affected Environment and Environmental Consequences

This section is organized by affected resource categories. Each affected resource section discusses the existing environmental baseline in the impact zone (potential area of impact of any of the alternatives) and the effects of the alternatives on each resource. Effects from the proposed action are reasonably foreseeable changes to the human environment, whether adverse or beneficial as compared to the environmental baseline for the no action alternative. The terminology “reasonably foreseeable effects” is used throughout and refers to effects of any planned actions that would be in place when the proposed action is implemented or any trends that would affect the future environment. However, only adverse effects (i.e. not beneficial) can be deemed a reasonably foreseeable significant effect. Effects that are speculative (i.e., there is a remote possibility that the impact would occur, but no meaningful information exists on which to base a prediction) or indefinite are not included. The impact analysis directly follows the description of the affected environment for a resource and is organized by alternative.

The impact analysis will evaluate various criteria, as defined below, to describe the context and intensity of impacts on affected resources. The Council on Environmental Quality does not require the use of these terms; however, they are commonly used in NEPA documents and will be referenced in the subsequent sections.

Impact analysis criteria and terminology are listed below.

- Adverse effects: negative or detrimental effects to the resource
- Beneficial effects: positive effects on the resource
- Direct effects: caused by the action and occur at the same time and place
- Indirect effects: caused by the action and are often later in time or farther in distance but are still reasonably foreseeable (indirect effects are considered when they are directly within the agency’s regulatory authority)
- Major: effects would be obvious, and would result in substantial local and larger scale consequences to the resource
- Minor: effects would be detectable but small, and of little consequence and would not affect the population or resource on a large-scale
- Moderate: effects would be readily detectable and may have some temporary effects to the population or resources on a large scale but would not cause a substantive decline or increase in the resource
- Negligible: resource is slightly affected but the impact is so minimal that effects are not detectable or may not be observable
- No effect: resource would not be affected
- Short-term effects: occurring in or relating to a relatively short period of time

- Significant effects: substantial adverse effects with respect to the context and intensity of a proposed action's impacts on resources
- Long-term effects: occurring in or relating to a relatively long period of time

If a resource is not expected to be affected, a brief justification is provided for why it was dismissed. The following resources were dismissed from further analysis:

- **Air quality:** Limited, seasonal livestock grazing is not expected to have a measurable effect on air quality.
- **Climate effects:** Limited, seasonal livestock grazing is not expected to have measurable climate effects. Therefore, if there are any effects, they are anticipated to be negligible.
- **Noise:** Grazing activities are not anticipated to affect current environmental noise levels, as livestock presence and associated grazing operations do not generate substantial or measurable noise beyond existing ambient conditions.
- **Visitor use and experience:** Public access and recreational uses are not allowed in the area where grazing is proposed. Therefore, there will be no effects to visitor use and experience.

3.1 General Description of Affected Environment Applicable to All Affected Resources

Ruby Lake National Wildlife Refuge is located in northeast Nevada, at the southern end of Ruby Valley. The Refuge is located along the base of the eastern slope of the southern Ruby Mountains. The refuge's water supply is fed primarily by numerous springs, most of which flow to the refuge from the west and the south. Historically, wildland fire, caused either by lightning or by native peoples, is believed to have been a frequent and major ecological factor in North America. It is reasonable to assume that fires originating in sagebrush could have easily been driven by wind into the meadows and marsh areas, thus affecting the ecology of these habitats. From 1958 to the present, prescribed fire has been used to restore bird nesting cover in meadows and grasslands where plant litter has become matted in addition to maintaining and restoring open areas in the marsh (Refuge Narrative Reports). Burning in the marsh, meadows, and grasslands is cyclic to maintain high-quality habitat.

The refuge's South Management Area is approximately 20,244 acres in size. It includes South Marsh, the largest marsh area on the refuge. The east side has meadows, large playa/ephemeral wetlands, and salt desert scrub habitats along with some short sagebrush habitat at the higher elevations. The west side of this management area has meadows, some riparian habitat, tall sagebrush, and many springs. The southern portion of this management area has large meadows, sagebrush, and many springs. While it is not completely free of human alterations, the South Management Area is considered the most pristine on the refuge. It has

the least amount of invasive plant species and the highest wildlife values. The area proposed for grazing is located within the South Management Area.

The wet meadow community is adjacent to marsh including dry ponds. It is mostly found on the west side of the refuge between the springs and the marsh. Dry meadow community is mostly found at the south and north ends of the refuge between the wet meadow and sagebrush (including rabbitbrush) habitat, including in the South Management Area. Even so-called “dry” meadows on the Refuge are sometime flooded during periods of higher precipitation or spring flows. Past management activities associated with meadow habitat on the refuge have included cattle grazing, mowing, prescribed fire, irrigation, and haying. The area proposed for grazing is located within the dry meadow community.

Key ecological attributes of refuge meadow include both short and tall grass conditions that meet the needs of target wildlife species; a diversity of grass and forb species; and adjacent riparian areas with willows and other shrubs. Conservation concerns include factors that reduce the water table and water supply to meadows; invasive plants, including reed canarygrass and cheatgrass; ground disturbance that creates bare soil conditions or areas otherwise open to invasive plants; and excessive predation or human-caused wildlife disturbance. General strategies for refuge meadows include maintaining some areas with tall dense nesting cover for associated wildlife species, and other areas with short grass primarily for foraging; and strategically controlling invasive plants.

Much of the area of refuge meadow proposed for grazing was formerly known as the Fort Ruby Grazing Allotment, which was previously owned by the Bureau of Land Management (BLM) and transferred to the Service in 1999. This area was previously contained within the privately owned Fort Ruby Ranch. Grasslands and shrub-steppe within Fort Ruby Ranch were historically heavily grazed by livestock, which resulted in damage to springs and pools, including fecal contamination, soil compaction, vegetation denudation, bank erosion, and water turbidity (USFWS 1999). The proposed area has not been a focus of grazing on the refuge in recent years. There is currently no public access allowed in the area proposed for grazing.

3.2 Natural Resources

Vegetation and Soils: Affected Environment

The extent of refuge meadows, including both wet meadows and dry meadows, is estimated to cover approximately 7,017 acres, or approximately 18% of the refuge. Grazing is proposed in dry meadow; however, areas of wet meadow are located adjacent to the proposed grazing unit. Both wet and dry meadow communities have saltgrass (*Distichlis spicata*), fiddleleaf hawksbeard (*Crepis runcinata*), and mountain rush (*Juncus arcticus*). The wet meadow community is adjacent to marsh including dry ponds. It is mostly found on the west side of the

refuge between the springs and the marsh. The wet meadow community has many invasives including foxtail barley (*Hordeum jubatum*), cheatgrass (*Bromus tectorum*), herb sophia (*Descurainia sophia*), and crested wheatgrass (*Agropyron cristatum*) and is likely highly variable with grasses dominating in dry years and sedges and forbs more prominent in wetter years (Trowbridge and Keller 2016). The refuge dry meadow community has approximately 28% grass cover dominated by alkali cordgrass (*Spartina gracilis*). The dry meadow has more forbs and sedges including common yarrow (*Achillea millefolium*), western boraxweed (*Nitrophila occidentalis*), clustered field sedge (*Carex praegracilis*) and seaside arrowgrass (*Triglochin maritime*) and more species overall compared to the wet meadow community (Trowbridge and Keller 2016). At higher elevations there are some meadows dominated by non-native species, most notably cheatgrass. Some of these non-native meadows may have been sagebrush habitat that was converted to meadow. Meadows within the southern portion of the refuge, including where grazing has been proposed, have very little invasive species cover. Most invasive vegetation on the refuge occurs near established roadways and near the refuge headquarters. Primary invasive species on the refuge are cheatgrass (*Bromus tectorum*) and crested wheatgrass (*Agropyron cristatum*).

Equis-Kolda association soils dominate the interior valley portions of southern part of the Refuge, including the project area. These soils are generally poorly to very poorly drained and composed of fine particles. These soils are moderately susceptible to erosion by rainfall and runoff (NRCS n.d.).

Vegetation and Soils: Environmental Consequences

Alternative A

Under Alternative A, current management would continue and livestock grazing would not occur on the refuge. Alternate management strategies, including prescribed fire, mechanical methods, and herbicide, would be used to control vegetation on the refuge. In the absence of livestock grazing, vegetation and soils would not be subject to potential adverse, direct effects of grazing, as are described in Alternative B. Excluding livestock grazing from the refuge would also limit the risk of spreading invasive vegetation, such as cheatgrass, along travel corridors and within refuge meadows.

The area of refuge meadow proposed for grazing is currently densely vegetated. While some tall, dense cover is appropriate nesting habitat for wildlife, further treatment is needed in this location to thin the vegetation, making it more suitable habitat for wildlife, and to increase structural diversity by providing some shorter forage. Under Alternative A, further vegetation treatment using livestock grazing would not occur and conditions may remain similar to what are observed currently. Livestock grazing would not be included in the suite of tools available to

manage refuge meadows and grasslands, which are used to support vegetation conditions suitable for migratory birds and other wildlife.

Alternative B

Grazing can adversely affect vegetation and soils through direct removal of biomass, trampling, erosion, and increased risk of spreading invasive species. However, under specific conditions, prescribed grazing may have beneficial effects on vegetation and soils by reducing residual dry matter and excessive vegetation biomass, adding nutrients to soil, providing a desirable mosaic of vegetation conditions, and promoting short grass forage.

Grazing during the dormant/late season (late summer and fall) would reduce the density of native and exotic grasses, including their thatch, but would be expected to have minimal effects on their long-term health and survival, because they would have already produced seed and senesced. Grazing during the spring, when plant species are actively growing, is expected to create more harm than if grazing occurs during the fall, when plants are senescing (NRCS 2006). As only fall grazing would occur on Ruby Lake NWR, adverse effects due to reduction of biomass and trampling are expected to be minimized. Effects of grazing would be monitored, and grazing strategies would be adapted as needed, to ensure that overgrazing of meadow vegetation does not occur. Additionally, because cattle select the most palatable forage species, units must be closely monitored to prevent undesirable changes in the plant species composition.

Intensive or indiscriminate grazing in arid and semi-arid ecosystems can temporarily disturb and trample topsoil, including biological soil crusts (BLM and USGS 2001, Floyd et al. 2003, Muscha and Hild 2006), causing soil and nutrient loss (Fleischner 1994, Li et al. 2025), and increasing the potential for short-term, localized exposure and compaction of topsoil that may result in increased erosion (Belsky and Blumenthal 1997, van Oudenhoven et al. 2015). Steeper sites (such as along the edges of the refuge in sagebrush steppe) may be more susceptible to grazing's potentially adverse effects on soil from defoliation, trampling, compaction, and exposure to erosion. However, the limited, seasonal grazing under the utilization rate specified to manage vegetation in meadow habitats, and on nearly level sites is anticipated to only have minor adverse effects. Effects of grazing on soils would be monitored to ensure that major adverse effects to soils do not occur; the grazing strategy would be adapted as needed if adverse effects are observed.

Livestock grazing may also affect refuge meadows by increasing the risk of introducing invasive species. Livestock grazing has been shown to increase the likelihood of cheatgrass invasion in sagebrush steppe ecosystems (Reisner et al. 2013) and, in a study of burned and unburned sites across the Great Basin, livestock grazing corresponds to increased cheatgrass occurrence and prevalence (Williamson et al. 2020). Cheatgrass cover, density, and abundance can quickly

increase in areas that have experienced disturbance due to factors including livestock grazing (Williamson et al. 2020, Mack 1981, Reisner et al. 2013, Pyke et al. 2016). Cheatgrass is very prevalent in the region, and cover is estimated at 15% or more across nearly a third of the Great Basin (Bradley et al. 2018). However, the southern portion of Ruby Lake NWR, including the area of meadow proposed for grazing, currently has very low occurrence of invasive species, based on current monitoring and treatment data. Appropriate best management practices, including placing livestock on weed-free feed for at least 72 hours prior to grazing and washing all vehicles and equipment prior to entry onto the refuge, will help to ensure that invasive species are not introduced to grazed areas from outside of the refuge or other areas on the refuge where invasive species occur. While there is the potential that livestock grazing could increase the risk or prevalence of invasive species on the refuge, implementation of best management practices, along with regular invasive species monitoring, and adjustment of grazing conditions based on the condition of refuge resources, will minimize potential adverse effects, which are anticipated to be minor in nature. Grazing on the Refuge would be controlled through a CAA and Special Use Permit (SUP), which define the seasonal timing, duration and intensity (in animal unit months, or AUMs) of the prescribed grazing treatment. The permittee would be required to follow the schedule outlined in the SUP unless otherwise approved by the Refuge Manager. Best Management Practices (BMPs) in the SUP would specify the timeframe and limit the duration and stocking rates to reduce adverse vegetation and soil impacts from livestock grazing to minor intensity. The SUP could be modified, at the discretion of the Refuge Manager, to avoid adverse effects to Refuge resources like vegetation and soils. Under Alternative B, the livestock cooperator would be responsible for implementing virtual fencing to exclude cattle from ecologically sensitive areas. Virtual livestock fencing provides adaptive control of livestock, allowing managers to respond to environmental needs (Bennett et al. 2026). Temporary fencing may be authorized by Refuge staff, as needed, to protect sensitive vegetation.

When conducted appropriately, prescribed grazing can have beneficial effects on vegetation in refuge meadows. Grazing reduces residual dry matter, breaks up thatch, exposes soil, adds nutrients to the soil (through manure), and incorporates seed into the soil (Wollstein and Rounds, 2012). At Ruby Lake NWR, grazing would be used on a prescription basis to reduce excessive biomass and provide a desirable mosaic of vegetation conditions that benefit a diversity of feeding and nesting wildlife. Additionally, late-season grazing would reduce grass heights and, when followed by fall/winter precipitation, would create areas of succulent, short grass preferred by geese for spring foraging. Targeted grazing strategies could give native perennial bunchgrasses and forbs a competitive advantage. In addition, grazing can reduce the abundance and continuity of fine fuel cover. As a result, the potential for spread of wildfires could be reduced (Strand et al. 2014). The intensity and exact location of grazing within the proposed area would be determined annually based on resource conditions and the need to provide an adequate distribution of short stubble habitat. Grazing would be prevented in shrub-

steppe communities, woody riparian communities, wetlands, and other areas with sensitive vegetation (springs, channels, ponds, etc.) to protect habitat quality.

Grazing intensity (animals per acre and duration) and time of year would be appropriately managed to capitalize on its advantages and avoid or minimize its disadvantages. At the Refuge, adverse effects to refuge meadows (overgrazing and trampling of meadow vegetation, soil compaction at livestock gathering areas, spread of invasive species) will be minor because the grazing intensity of the prescribed grazing program would remain light to moderate, grazing would be of short duration, and effects of grazing on the Refuge would be regularly assessed to determine necessary changes to the grazing strategy. The Service expects that the less intense and shorter duration prescribed grazing program will favor reseeding of native perennial grasses, forbs, and other desirable plants over invasive grasses. There would be no effect to refuge wetlands or vegetation of special management concern, as these areas are excluded from the proposed grazing unit.

Fish, Wildlife and Species of Concern: Affected Environment

Over 200 species of birds regularly use the Refuge. Designated as one of 500 Globally Important Bird Areas by the American Bird Conservancy, the Refuge is an important waterfowl nesting area and is strategically located along migration corridors serving both the Pacific and Central Flyways. Fifteen species of waterfowl nest on the Refuge, including Canada geese, and canvasback and redhead ducks. Other priority species include greater sandhill crane, white-faced ibis, long-billed curlew, trumpeter swans, and colonial nesters such as snowy and great egrets, black-crowned night herons, and great blue herons.

The Refuge is on the eastern edge of the Pacific Flyway. Its strategic location and large area of wetlands contribute to significant numbers of ducks, geese, shorebirds, and wading birds crossing the Nevada deserts between breeding and wintering grounds (NDOW 2022). Ruby Lake is well-known as an important breeding place for canvasback, redhead, cinnamon teal, lesser scaup, trumpeter swan, white-faced ibis, sandhill crane, eared grebe, black-necked stilt, American avocet, and long-billed curlew. North-south trending valleys with surface water, like Ruby Valley, concentrate migrating songbirds (USFWS 2003). The Refuge hosts approximately 75% (58 of 77) of Nevada's priority bird species (GBBO 2010) including both bald and golden eagles.

The Refuge also hosts many mammals and reptiles that are common to the Great Basin Desert such as black-tailed jackrabbits, mule deer, pronghorn, and Great Basin rattlesnakes, as well as uncommon aquatic species like the northern leopard frog, a species that is declining in the Western U.S., and a remnant population of endemic relict dace. Currently, northern leopard frog (*Lithobates pipiens* or *Rana pipiens*) is considered a state-protected species by the Nevada Department of Wildlife and a Sensitive Species in Nevada by the U.S. Bureau of Land

Management (BLM 2023). The northern leopard frog may occur throughout the refuge where water is available.

The Refuge provides habitat for a wide variety of wildlife other than waterfowl/marsh birds. A large variety of songbird species use the Refuge for nesting or during migration. The Refuge borders a migration corridor in the Ruby Mountains used by the largest mule deer herd in Nevada. Pronghorn antelope are year-round residents on the Refuge. The marsh provides habitat for muskrats, and the grasslands and sagebrush steppe provide habitat for rabbits and ground squirrels. Riparian areas attract porcupine, small rodents, and many songbird species. Sage grouse are occasionally observed in the sagebrush steppe. Coyotes, northern harriers, kestrel, rough-legged hawk, and ravens are frequently observed on the Refuge. Mountain lions, bobcats, and weasels are also present in smaller numbers.

Bald eagles, golden eagles, and peregrine falcons sometimes occur on the Refuge. A small group of bald eagles use the Refuge during the winter and peregrine falcons are rare migrants, although they have not been observed in recent years. The area of the refuge in which grazing has been proposed is rarely used by bald eagles and golden eagles. The Refuge also provides habitat for the following species of concern: relict dace, white-faced ibis, ferruginous hawk, Swainson's hawk, and long-billed curlew.

Burrowing owls and short-eared owls are known to occur on the refuge. Short-eared owls are associated with marsh and meadow habitats on the refuge. Burrowing owls are associated with salt desert scrub and sagebrush habitats and are also known to use refuge meadows. Short-eared owls typically avoid short vegetation habitats and prefer dense nesting cover (Shaffer et al. 2021). Nesting habitat for burrowing owls consists of open areas, including sparse vegetation and bare ground, and available mammal burrows. In Nevada, burrowing owls are most frequently found in salt desert scrub or sagebrush and will often breed on the fringes of agricultural lands (Klute et al. 2003). Both short-eared owls and burrowing owls are known to forage in refuge meadows.

The only fish native to the Refuge is the relict dace, a tiny fish endemic to just four valleys in northeast Nevada. It is adapted to the natural wet and dry cycles and variations in alkalinity of marsh habitat in Ruby Valley. During dry periods it is able to survive within springs and constricted marsh areas. During wet periods it has the capacity for explosive population growth and can populate large marsh areas in a short period of time (Stein and Salisbury 1994 as cited in Heitmeyer and Henry 2013:25; Crookshanks 2007). This phenomenon is evident at Franklin Lake, a wetland north of the Refuge in Ruby Valley which does not have introduced non-native fish. Relict dace were once abundant throughout the springs and sloughs of Ruby Lake (Hubbs et al. 1974 as cited in Heitmeyer and Henry 2013:25); however, due to predation by introduced largemouth bass and trout they are now absent from the marsh and found only in a few

isolated springs (Otis Bay Ecological Consultants 2012). Relict dace are present in three ponds on the Refuge, including in a pond located to the east of the proposed grazing area.

Meadows provide important nesting and foraging habitat for a variety of waterfowl, waterbirds, and shorebirds. Meadows provide brood-rearing cover for sage-grouse, forage for pronghorn antelope, and support small mammal and rodent populations. Meadows and grasslands are important to migratory birds for foraging, pairing, nesting, and rearing young. The Refuge is managed to provide high quality habitat for a large diversity of migratory birds and other wildlife. Dense cover and short stubble habitat is maintained on the Refuge during the breeding, nesting, and brood-rearing periods to meet the diverse need of a variety of bird species.

Meadows are a transition habitat between marsh and grassland habitat and are dominated by sedges, rushes, and grasses. Meadows are attractive to a large diversity of wildlife and provide dense nesting cover for ground-nesting waterfowl and many other bird species, such as sandhill cranes, ducks, geese, and white-faced ibis. Residual meadow vegetation serves as a nesting substrate for waterfowl, such as Canada geese, mallards, cinnamon teal, and many songbirds. New plant growth and invertebrate production in short stubble habitat will provide forage for Canada geese and dabbling duck species. Treated (grazed, mowed, or burned) meadow vegetation provides high-protein browse when high-protein forage is needed during early spring for egg development and during summer and fall for growth of young and feather molt. Residual vegetation in idle meadows provides a nesting substrate for waterfowl such as Canada geese, mallards, cinnamon teal, gadwall, and many songbird species. Meadows, especially idle meadows, can support large populations of small mammals which are important prey for raptors, coyotes, weasels, foxes, and bobcats. Meadows under long-term idle management become heavily matted with residual vegetation which decreases productivity and affects the vertical structure of vegetation that is important to nesting waterfowl. Periodic manipulation of matted meadows is required to restore nesting habitat. Meadows manipulated annually are important feeding areas for sandhill cranes, geese, white-faced ibises, and some shorebird species. Manipulated meadows provide high-protein foods during early spring for egg development and during summer and fall for growth of young. Some species of shorebirds, such as the Wilson's phalarope, nest in manipulated meadows (USFWS 2003).

Active sage-grouse leks occur on the north and the south boundaries of the Refuge. Additional historic leks not surveyed recently occur near refuge boundaries. Sagebrush communities on the refuge are in close proximity to springs, meadows, and wetlands, providing for all of the lifecycle needs of sage-grouse. Signs of pygmy rabbits were found in several areas of sagebrush on the refuge, and pronghorn actively use sagebrush and meadow areas of the refuge. Due to the potential prevalence of pygmy rabbits and their burrows occurring throughout sagebrush habitats and the potential adverse effects of grazing on pygmy rabbits, only refuge areas with meadow habitat are being considered for grazing.

Fish, Wildlife and Species of Concern: Environmental Consequences

Alternative A

Under Alternative A, current management would continue and livestock grazing would not occur on the refuge. Alternate management strategies, including prescribed fire, mechanical methods, and herbicide, would be used to control vegetation on the refuge and manage for wildlife habitat. In the absence of livestock grazing, wildlife species would not be subject to the potential adverse, direct effects of grazing on wildlife species, as described in Alternative B. Under Alternative A, livestock grazing would not be available in the suite of management tools to treat vegetation in a portion of refuge meadow that is densely vegetated and lacking structural diversity. Current conditions limit the quality and availability of wildlife habitat, including nesting and foraging areas, especially for species that benefit from lower-stature or sparser vegetation.

Alternative B

Grazing and grazing operations may affect wildlife through temporary disturbance or displacement; changes in behavior or reproduction; alteration of wildlife habitat, including removal of available forage; and due to temporary fencing, if it is used. Grazing can provide beneficial effects to wildlife by creating short-grass areas for spring foraging by geese and other wildlife species. Prescribed grazing can serve as habitat management treatment to open dense stands of vegetation and create a diverse mosaic landscape of vegetation heights, which can improve foraging and habitat conditions for some migratory birds and wildlife species.

Grazing during early spring would remove new plant growth which is needed as early spring forage for breeding and migrating birds. Consequently, wildlife would be forced to compete with cattle for available forage. Additionally, grazing during early spring may damage plants that are initiating new growth and could adversely impact ground-nesting birds. Early spring grazing would reduce the quality of wildlife habitat; therefore, grazing would only be offered during the late summer and fall seasons to avoid these potential adverse impacts to breeding and migrating birds.

Grazing may result in potential adverse wildlife disturbance, which would likely be highest when livestock are turned out and rounded up to be removed from the grazing area. Human disturbance has differential effects on wildlife and is dependent upon many variables, including the species involved and age, time of year, and breeding cycle stage (if applicable). For birds, variables also include the activity in which the birds are engaged (e.g., foraging versus nesting); prey density and nutritional requirements for feeding birds; flock size (large flocks may be more easily disturbed); whether the species is hunted; the surrounding environment; whether the disturbing activity involves vehicles; the type, size, intensity, speed, noise, nature, and

frequency of the disturbing activity; and the approach angle or directness of approach to an animal (Blanc et al. 2006; Goss-Custard and Verboven 1993; Hammitt and Cole 1998; Kirby et al. 1993; Knight and Cole 1995a; Knight and Cole 1995b; Lafferty 2001a; Lafferty 2001b; Rodgers 1991; Rodgers and Schwikert 2002; Rodgers and Smith 1997; Smit and Visser 1993). Disturbance and flushing of birds or even raising their alert levels (which usually occurs at a greater distance than that for flushing), creates stress and requires animals to alter their normal behavior and expend energy that otherwise would be invested in essential life-cycle activities such as foraging, migration, predator avoidance, mating, nesting, and brood-rearing. Disturbance can cause birds to stop feeding, cause abandonment of nests and young, allow predators access to nests/young, reduce parental attention to young, and otherwise impact survival of individual animals, including birds, eggs, nestlings, broods, young, and juveniles (Burger and Gochfeld 1991; Haysmith and Hunt 1995; Lafferty 2001b). Breeding birds are especially sensitive to human disturbance (Hammitt and Cole 1998; Trulio 2005). A study of visitors to a colony of kittiwakes (*Rissa tridactyla*) and guillemots (*Uria aalge*) revealed that nesting success was influenced by the distance observers were from the birds (positively correlated) and the number of observers involved (negatively correlated) (Beale and Monaghan 2004). Adverse effects to ground-nesting birds will be minimized by restricting grazing to the time period of August to December, after their nesting season is over.

Studies have shown mixed results regarding potential habituation of birds and some other taxa to human disturbance. Wildlife are often less disturbed by routine human activities that repeatedly occur along defined routes (e.g., trails, roads, or water channels), especially frequent disturbance that does not involve direct contact or other threat, compared with those activities that occur irregularly and outside predictable paths/channels (Blanc et al. 2006; Burger 1998; Knight and Cole 1995b; Smit and Visser 1993). Some species can habituate to the presence of humans who stay in the same general location and remain relatively still (Goss-Custard and Verboven 1993; Smit and Visser 1993). Habituation to some types and levels (intensity and frequency) of human disturbance appears to vary among species, within species, between resident and migratory populations, and potentially between inexperienced and experienced breeders. This variance among species makes forecasting habituation in specific field situations speculative. As noted above, some species of wildlife are relatively tolerant of grazing livestock. For other more sensitive species however, the presence of ranching-related vehicles, livestock and personnel in fields and along the access route(s) could result in temporary displacement.

The efficacy of virtual fencing for containing livestock to designated grazing areas would be monitored by Refuge staff and the Cooperator. If the Refuge determines temporary fencing in addition to virtual fencing is necessary to contain livestock or protect sensitive habitat areas, the minimum amount necessary would be installed, and it would be removed when livestock are taken off the unit. The additional, temporary fencing would be electric and/or wildlife-

friendly wire to allow animals like deer, elk, coyote, and pronghorn to safely pass over or under the smooth top and bottom wires. Wire fencing has the potential for loose, sagging, or damaged wires to trap legs or antlers of wildlife such as pronghorn or deer. Animals could collide or entangle with fences if high-visibility markers or top rails were missing. Temporary fencing as it would occur in the scope of Alternative B would not be expected to significantly impede wildlife crossings or migrations.

While there would be some short-term, minor adverse impacts to wildlife associated with grazing, treated areas can create beneficial effects by providing excellent foraging sites for nesting and migrating sandhill cranes, white-faced ibis and Canada geese. Canada geese require short stubble meadows for feeding and rearing young. Providing short stubble and light residual cover for feeding and nesting in meadows, grasslands, and alkali playa near water and emergent marsh vegetation can also benefit common snipe, killdeer, prairie falcon, long-billed curlew, short-eared owl, chipping sparrow, savannah sparrow, willet, American avocet, horned lark, lark sparrow, and Wilson's phalarope (USFWS 2003).

Sandhill cranes require high-protein foods in areas adjacent to emergent marsh habitat during the nesting period and when rearing young. Meadows that contain short-stubble vegetation may provide high-protein foods including new plant growth and abundant invertebrates. Cranes nest when the female has acquired sufficient protein for egg laying. Early nesting contributes to higher production because survival of young is greater when young fledge by mid-summer (USFWS 2003). Meadows that have been burned, mowed, or grazed may contribute to early nesting because of the increased availability of nutritious food. Periodic disturbance, such as livestock grazing, has been shown to enhance diversity of arthropods that are important food sources for birds (Goosey et al. 2019). Idle meadows or idle areas of manipulated meadows are used for brood rearing, and residual vegetation provides escape cover for young.

Numerous songbird species use refuge habitats for nesting and feeding. Some nesting species require residual vegetation in meadows, grasslands, and shrub-steppe habitats. Nesting habitat in meadows and grasslands must provide a variety of vegetation density conditions because of the variation in habitat requirements of the songbird species that nest on the refuge. Other nesting species require dense, woody growth near water. Meadows and grasslands that contain residual vegetation provide abundant high-protein foods, such as plant seeds and invertebrates. Treated meadow management in combination with idle management of meadows, grasslands, and woody riparian areas can provide high-quality habitat (USFWS 2003). Grazing in meadows and grasslands can adversely affect bird nest success because of direct disturbance by cattle; however, these adverse effects are expected to be minimal, if any, as grazing entry will not commence until August at the earliest.

When grazing occurs in sagebrush habitat, Beck and Mitchell (2000) suggest that livestock grazing is likely to have an indirect effect on sage-grouse productivity by altering the habitat that they need to reproduce. Activities associated with grazing in sagebrush could cause minor, adverse effects to Greater sage-grouse (*Centrocercus urophasianus*) adults and chicks by reducing the grasses, forbs, and sagebrush that provide nutrition, concealment, and nesting cover (Braun et al., 1977; Klebenow, 1982, 1985, Street et al. 2025). Potential adverse effects would be minimized because grazing would remain light to moderate in intensity and would only be offered in meadow habitat away from documented, well-established lek sites and outside of the spring breeding/lekking season (February to May). Established, known sage-grouse lek sites would be excluded from the grazing area if it is expected that grazing would result in adverse effects. Grazing operations could begin as early as August and could potentially go through December, thereby occurring outside of the sage-grouse spring breeding season. Early brood rearing for sage-grouse (late May to mid-July) would be completed, and late brood rearing (typically mid-June to mid-September) would nearly be completed before grazing operations could commence.

Grazing would also affect the availability of grasses and forbs available for small rodents and mammals in treated areas. Perennial forbs play a vital role in supporting rodent prey species' activity and indirectly, their predators (Schroeder et al. 2025). Robust herbaceous cover helps shield small mammals from predators, such as hawks, foxes, bobcats, and coyotes. Higher abundance of forbs correlates directly with increased foraging and burrowing activity among prey species. When conducted in sagebrush habitat, grazing may adversely affect the pygmy rabbit by inadvertent trampling over burrows, reducing foraging vegetation, and temporarily displacing individuals. To avoid and minimize adverse effects, grazing would only be conducted in refuge meadows and will avoid locations near known pygmy rabbit burrows. Pygmy rabbit habitat is often dominantly characterized by big sagebrush, antelope bitterbrush (*Purshia tridentata*), western serviceberry (*Amelanchier alnifolia*) and green rabbitbrush (*Chrysothamnus viscidiflorus*). Pygmy rabbits dig their own burrows and are consequently associated with habitat characteristics that are conducive to their burrowing needs. The rabbit typically inhabits areas with tall (1 to 1.5 meter), dense sagebrush on deep, soft/loose soils, of wind-borne or water-borne (e.g., alluvial fan) origin (Chapman et al. 1982, Katzner and Parker 1997).

Wildlife disturbance from grazing would be seasonal, intermittent, and confined to access routes and the units being grazed. Therefore, disturbed wildlife could move to other areas of the Refuge that are not open to grazing. The primary use of virtual fencing will allow a grazing program to avoid most adverse effects of physical fencing used to control livestock movements, such as potentially re-directing, entangling, or killing wildlife or otherwise hindering their movements (Bennett et al. 2026). Some adverse effects of physical fencing may occur if temporary fencing is authorized by refuge staff; however, adverse effects are expected to be minor, as only the minimum amount of fencing necessary would be installed, fencing would be

removed following the grazing season, and only wildlife-friendly fencing would be used. Grazing may provide beneficial effects to some wildlife species by creating nutrient-dense short grass areas for spring foraging. Nonetheless, some adverse effects to wildlife would occur due to disturbance by livestock grazing activities, but they are anticipated to be minor in nature.

The monarch butterfly (*Danaus plexippus*) is known to be present at Ruby Lake NWR, and suitable milkweed habitat also occurs in some areas of the refuge. The known milkweed patches closest to the potential grazing area would be excluded from the grazing unit, and they would be buffered to avoid direct impacts from livestock. The area(s) being proposed for grazing are outside of proposed Critical Habitat for monarchs. It is unlikely Suckley's cuckoo bumble bee (*Bombus suckleyi*) occurs on the refuge. No surveys have been conducted for this species on the refuge or nearby. If the species did occur on the refuge, it is unlikely grazing would measurably impact the species. Adverse effects to monarch butterflies and Suckley's cuckoo bumble bee are not expected to occur.

Livestock grazing can affect golden eagles in grassland and shrub-steppe landscapes by indirectly influencing availability of the eagle's prey (Murphy et al. 2023). Knowledge of this interaction and management recommendations related to grazing are limited, except that livestock grazing generally is believed to be positive for the golden eagle and its primary prey (Bock et al. 1993). However, over-grazing is generally believed to have adverse impacts to golden eagles (Bedrosian et al. 2019). Livestock grazing may affect golden eagles by altering the structure and composition of vegetation (Milchunas et al., 1989; Samson and Knopf, 1996; Holechek et al, 2006) in ways that influence abundance and availability of sciurids and leporids, which can be focal prey groups. For example, based on a study done in California, (Hunt et al. 1995) it was suggested that golden eagles used grazed grasslands for foraging because their primary prey (ground squirrels) in that region favored grazed areas that had reduced grass height (as cited in Murphy et al. 2023). If grazing reduces prey species for bald and golden eagles (e.g., small mammals or reptiles), this may result in adverse effects to the species. A variety of human activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed, or raise young (USFWS 2007). The refuge would follow the National Bald Eagle Management Guidelines Category A recommendations for agriculture activities if bald eagles nest within one mile or golden eagles nest within two miles (USFWS 2007). Grazing would only occur within a small portion of the refuge that is rarely used by bald and golden eagles, is limited to the fall season, and would be only light to moderate in intensity. Therefore, grazing as it is being proposed is not expected to adversely impact bald or golden eagles in a significant way.

Short-eared owls and burrowing owls may be affected by livestock grazing disturbance. Short-eared owls would likely be adversely affected by vegetation disturbance during the nesting season, and are likely to be adversely impacted by overgrazing, as they prefer dense nesting cover (Shaffer et al. 2021). Additionally, if grazing reduces prey species of the short-eared owl,

including small mammals, this could result in adverse impact to the species. However, periodic disturbance of grasslands, including through livestock grazing, may beneficially affect the short-eared owl by maintaining suitable nesting habitat (Shaffer 2021). As grazing at Ruby Lake National Wildlife Refuge would occur outside of the short-eared owl nesting season, and would only be light to moderate in intensity, any adverse effects to the short-eared owl are expected to be minor. The burrowing owl prefers sparsely vegetated habitats, often using pasture lands for foraging during the breeding season. Nest site suitability is not expected to decrease due to grazing, as the species prefers areas with increased visibility. Adverse effects to the burrowing owl may occur if grazing results in increased invasive species presence, especially in shrub habitats (Klute et al. 2003), or if inadvertent trampling of mammal burrows occurs. The burrowing owl may benefit from a reduction of vegetation biomass that would result from grazing, as they prefer areas with sparser vegetation.

Unrestricted livestock grazing near streams and riparian areas can adversely affect aquatic organisms by degrading aquatic habitats through increased nutrients, sedimentation, and fecal bacteria; bank erosion due to trampling; and through alterations to stream channels and riparian areas (Grudzinski et al. 2020; Butler 2013). If alterations to stream channels and riparian areas result in water spreading farther and evaporating more quickly, less water would be available for wildlife, including species like the northern leopard frog and relict dace. Grazing would not be offered in sensitive riparian areas and is only being proposed in meadow habitat. Streams and permanent bodies of water in the nearby vicinity would have, at minimum, 100-foot buffers to prevent cattle directly accessing sensitive aquatic areas. Buffers may be increased if stream effects are detected when grazing is implemented, which could adversely impact fish or wildlife species. Short-term, adverse impacts to aquatic wildlife would be minor.

Water Resources: Affected Environment

The refuge's water supply is fed primarily by numerous springs, most of which flow to the refuge from the west and the south. In 2012, a total of 216 springs were estimated to supply water to the Refuge (Esralew and Holmes 2012). Additional subaqueous springs supply water to the Refuge but could not be measured (Esralew and Holmes 2012).

Springs are found along the western and southern edges of the refuge and have marsh plant communities close to the springs themselves and meadow communities further away. Springs within the former Fort Ruby Ranch area, which are adjacent to the area proposed for grazing, were previously degraded by historic heavy livestock grazing. Upon transfer to the Service in 1999, it was noted that all of the springs and pools in this area had been damaged by livestock through fecal contamination, soil compaction, vegetation denudation, bank erosion, and water turbidity (USFWS 1999). Since 1999, springs have recovered from most adverse impacts of heavy livestock use. The area currently proposed for grazing excludes known springs and wetlands and incorporates a buffer of at least 100 feet on either side of known water bodies.

Other surface water on and near the Refuge is sourced by runoff from precipitation and snowmelt (Berger 2006). The majority of stream flow in the southern Ruby Mountains, Maverick Springs Range, Medicine Range, and the southern East Humboldt Range is ephemeral (Berger 2006). During spring, stream channels have the ability to carry a moderate amount of flow; however, it has been observed that by the end of June these streams are mostly dry (Dudley 1967). Berger (2006) estimated a reasonable runoff quantity for the southern Ruby Mountains that ranged from 9,000 to 10,000 acre-feet per year. However, considering the general lack of data regarding surface water runoff in the southern Ruby Valley and the ephemeral nature of the streams, estimations based on surface water supply are made cautiously (Berger 2006). Much of this surface water likely does not reach the Ruby Lake marsh system in most years, though, during extreme storm events, surface water runoff can possibly connect with the marsh system and does fill playa areas to the north of the marsh units (USFWS 2014).

Water Resources: Environmental Consequences

Alternative A

Under Alternative A, current management in refuge meadows would continue and grazing would not be permitted. Potential adverse effects to water resources due to grazing, as described in Alternative B, would not be observed under this alternative. Other management tools, including herbicide, mechanical control, and fire, may continue as needed in this area of refuge meadow. Best management practices would continue to be implemented when using these management alternatives, to avoid adverse effects to water resources.

Alternative B

Under Alternative B, livestock grazing would be implemented in an area of dry meadow. Cattle would not be permitted to access aquatic resources (including springs, streams, wetlands, or other water bodies) or riparian areas within a designated buffer of known water sources. Unrestricted livestock grazing can degrade aquatic habitats and water quality through increased nutrients, sedimentation, and fecal bacteria; bank erosion due to trampling; and through alterations to stream channels and riparian areas (Grudzinski et al. 2020; Butler 2013). Grazing in riparian areas can increase the availability and transport of sediment, nutrients, and fecal indicator bacteria into streams, damaging aquatic systems and reducing water quality (Grudzinski et al. 2020; Grudzinski et al. 2016; Miller et al. 2016; Larsen et al. 2011; Hubbard 2004). Due to adverse effects of allowing cattle unrestricted access to streams and water bodies, cattle at Ruby Lake NWR would be confined to a limited area of refuge meadow via virtual fencing (and potentially temporary fencing, if authorized by Refuge staff), and would be excluded from known water resources and riparian areas.

Excluding livestock from aquatic systems with appropriate buffers would help to minimize the effects of livestock grazing on water quality. At Ruby Lake NWR, a buffer on any side of known streams, springs, or water bodies would be implemented. Fencing has been shown to be effective in improving water quality parameters in studied areas, as exclusion of cattle from streams reduces defecation into aquatic systems (Grudzinski et al. 2020). Buffer widths greater than 5 to 10 meters were shown to increase the likelihood of improving water quality, and are consistent with previous studies on the effectiveness of buffer widths in removing suspended sediments, fecal bacteria, and nutrients (Grudzinski et al. 2020; Fischer and Fischenich 2000; Zhang et al. 2010). At Ruby Lake NWR, virtual fencing would be used to exclude cattle from known water resources and riparian areas with a buffer of at least 100 feet on each side of water bodies. Temporary fencing may also be authorized by Refuge staff, if needed, to protect water resources. While there may still be some minor adverse effects to water resources from livestock presence in refuge meadows, or due to escaped cattle and calves, exclusion from aquatic resources with appropriate buffers will help to minimize any adverse effects so that they remain minor in nature. Additionally, regular monitoring of grazed areas and visual assessment of impacts to water resources will occur. Grazing conditions, including the identified buffer around aquatic resources, could be adapted to ensure that adverse effects to water resources remain minor, if they occur at all. Limited, seasonal grazing in refuge meadows, with appropriate buffers around aquatic resources, will help to ensure that any adverse effects to water resources are minor and short-term.

3.3 Tribal, Cultural, and Historic Resources

Tribal, Cultural, and Historic Resources: Affected Environment

The Western Shoshone, Northern Paiute, and Goshute have ties to Ruby Valley. These groups occupied much of central and eastern Nevada and western Utah prior to settlement by Euro-Americans. The Ruby Mountains were important for hunting deer, pronghorn, rabbit, sage-grouse, squirrel, and, on the higher slopes, mountain (bighorn) sheep. Ruby Valley mineral red clay was gathered for use in dyes and paint. Plants of the yampa, seeds, and roots, used both medicinally and for food, were gathered in Ruby Valley (Bengsten 2009). There are hot, warm, and cold springs within Ruby Valley. Although most Newe say that all springs are sacred places, hot and warm springs seemed especially important for their healing attributes, as well as for bathing. In the past, the Newe cooked meat and other food in the hot springs. The warm springs were used for bathing and curing ailments (Bengsten 2009). Archaeological surveys on Ruby Lake Refuge and surrounding federal land provide direct evidence of Native American presence within Ruby Valley. By 2014, nearly 400 sites had been recorded on Ruby Lake Refuge; however, only a small number of them had been evaluated to determine if they contain important data and meet the standards of the National Register of Historic Places (NRHP). Evidence of historic use by Tribes may be present throughout the refuge.

The most obvious historical sites recorded on Ruby Lake Refuge that are associated with the historic period are the Bressman Cabin, Fort Ruby, and the Pony Express/Overland Stage Station site. The Bressman Cabin was determined to be eligible to the NRHP, with SHPO concurrence. This historic site is located near Refuge Headquarters, not in the vicinity of where grazing has been proposed. Built in 1859-1860, the Pony Express/Overland Stage station was located on what is now Ruby Lake NWR. In 1957, the one remaining log building was moved to Elko and reassembled in front of the Historical Museum. The original archaeological site from which the original building, located south of where grazing has been proposed, was salvaged but has not yet been evaluated for eligibility to the NRHP. The Pony Express National Historic Trail and the California National Historic Trail also cross the refuge, but do not coincide with the location in which grazing has been proposed. Fort Ruby encompasses about 20 acres and has two buildings, a stone spring house and a log cabin. An interpretive trail has been established at the Fort Ruby site with 11 interpretive panels. A round trip of the trail covers about half a mile. The Fort Ruby site and the remains of Fort Ruby are considered a National Historic Landmark. Fort Ruby is located on the southern end of the Refuge, to the west of where grazing has been proposed. Additionally, near the area where grazing has been proposed, there may be some remnant fences of potential historical significance from grazing that were established before the land became a part of the refuge. (pers. comm Dan Dewey, 2026).

Additionally, Ruby Marsh was designated as a National Natural Landmark in 1972 because of the biological diversity and pristine condition of the habitat. In 1999, the Service designated 10,000 acres of Ruby Marsh as a Research Natural Area. Research natural areas are intended to represent the full array of North American ecosystems with their biological communities, habitats, natural phenomena, and geological and hydrological formations.

Tribal, Cultural, and Historic Resources: Environmental Consequences

Alternative A

Under Alternative A, there would be no change in the current use of refuge meadows. Under Alternative A, the Service would continue to exercise Section 106 of the National Historic Preservation Act on a project basis to eliminate or minimize adverse effects to cultural resources. Minor ground disturbances may continue to result from habitat management. There would be no additional impact to archaeological resources or historic properties.

Alternative B

Under Alternative B, grazing would be implemented in a portion of refuge meadow, increasing disturbance in this area. While there are no known designated historic properties located within the area proposed for grazing, there are some historic sites and areas of special land

designation in the vicinity. There is a small chance that escaped cattle could enter areas closer to historic sites; however, the use of virtual fencing (and temporary fencing, as needed) will minimize this risk and ensure that cattle stay only within the allotted grazing area. As grazing will be confined to the meadow, adverse effects of grazing are not expected to occur in Ruby Marsh.

Implementation of virtual fencing and temporary fencing, if authorized, may require minor ground disturbance. Virtual fencing towers may be installed on the ground or anchored to a trailer. Archaeological resources are located throughout the refuge and may be present within the area where grazing has been proposed. However, ground disturbance due to grazing and related activities is expected to be minor, and adverse effects to archaeological resources are not expected.

In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the disturbance of archaeological or historical sites, and the removal of artifacts are prohibited. The excavation, disturbance, collection, or purchase of historical, ethnological, or archaeological specimens or artifacts, or mementos from the Refuge is prohibited. Livestock operators would be instructed not to disturb and would be prohibited from collecting and removing archaeological or historic artifacts, abiotic or biological specimens or samples, or mementos from the Refuge.

All undertakings would continue to comply with Section 106 of the NHPA, and cultural resources review and compliance would occur before grazing would be implemented. With these measures, adverse effects to archaeological resources and historic sites due to grazing are not expected.

3.4 Socioeconomics

Socioeconomics: Affected Environment

The U.S. Census Bureau (USCB 2025) estimates White Pine County's total percentage of population age 16 plus in the civilian labor force (2020-2024) as 49.4%, and Elko County's at 67.1%, compared to Nevada's state average of 62.6%. The 2020-2024 median household income for White Pine County is estimated at \$72,865, while Elko County is \$86,487. The Nevada average median household income for this time period is \$78,260. The 2020-2024 estimates show Elko County's percent of persons in poverty as 9.5% and White Pine County as 12.6%, compared to Nevada's average of 11.6%.

Elko County's Public Land Use & Natural Resource Management Plan (Elko County 2010) lists "[g]old, silver and other metal ore mining" as its top economic sector by value of output, listed for the Elko Micropolitan S.A. in 2004. This area includes the nearby county of Eureka, Nevada. The plan shows that another important economic activity in Elko County is agriculture and

livestock production, which helps the county carry through periods of slowed mining activities. At the time this report was written, eighty-five percent of the total AUMs permitted were on BLM lands, with 15% on U.S. Forest Service (USFS) land and “a small amount of grazing [...] permitted on the Ruby Lake Wildlife Refuge.” (Elko County 2010). Major crop acreage and livestock production were both seeing downward trends by 2006, with federal animal unit months (AUMs), or grazing areas allotted to ranches, playing a key factor in the likelihood of bankruptcy. A linear programming model simulating a representative Elko County ranch operation showed a less than 1% chance of bankruptcy was present as long as AUM reductions were less than 50%, a 12% chance at a 75% reduction, and a 96% chance of bankruptcy if no federal grazing land was available.

Grazing ceased on the refuge in 2021; however, the amount of grazing acreage provided by the refuge at that time was miniscule in comparison to grazing land provided by BLM and the USFS (Elko County 2010) and resulted in little change to overall local and regional grazing availability.

Land use near the refuge includes the Pony Express National Historic Trail, historic/cultural sites, grazing, and dispersed recreation, with infrequent and scattered ranches. There is currently no public or recreational access permitted in the proposed grazing unit; however, the proposed grazing unit is visible from some publicly accessible areas, including an observation deck at the southern boat launch (Narciss Boat Landing).

Socioeconomics: Environmental Consequences

Alternative A

Under Alternative A, there would be no change in current refuge management, and grazing opportunities would not be provided at Ruby Lake NWR. While federal grazing land is important to local and regional economies, the refuge has historically provided a very low percentage of grazing AUMs, especially when compared to surrounding BLM and Forest Service lands (less than 1% of permitted AUMs on federal land in Elko County in 2006) (Elko County 2010). Given the small area of rangeland on the refuge compared to surrounding public lands, the continued lack of grazing on the refuge is expected to have negligible effects on the local and regional economies. Surrounding land use and current public access restrictions on the refuge would continue under Alternative A.

Alternative B

Under Alternative B, grazing would be implemented on approximately 414 acres within the refuge. This would provide an additional grazing opportunity for local ranchers on federal lands and would contribute to the federal AUMs available in the area. However, as the BLM and USFS provide far greater quantities of federal land available for grazing, the addition of a small

quantity of grazable land on the refuge is unlikely to result in any measurable change to the local or regional economies.

Implementing grazing at Ruby Lake NWR would have no effect on surrounding land use. As no public or recreational access is currently permitted in the proposed grazing unit, implementing grazing would have no effect on visitor use on the refuge. The proposed grazing unit is visible from some publicly accessible areas, so there may be minor changes to visual resources. However, these effects are expected to be negligible. Implementing Alternative B would likely have negligible to minor effects on socioeconomics.

3.5 Refuge Resources

Administration, Management, and Operations: Affected Environment

Currently, Ruby Lake NWR has three full-time staff members (FTE), in addition to small seasonal biological crews. Staff include a Project Leader/Wildlife Refuge Manager, Wildlife Biologist, and Equipment Operator. Full-time staff are responsible for administrative, biological, and management activities on the refuge, including administering permits, monitoring refuge resources, treating invasive species, communicating with partners, coordinating contracts, conducting compliance, maintaining equipment, performing vegetation management, serving visitors and members of the public, and other tasks.

Administration, Management, and Operations: Environmental Consequences

Alternative A

Under Alternative A, there would be no change to administrative functions, or management and operations at the refuge. Staff duties would remain consistent, based on existing uses of the refuge.

Alternative B

Refuge staff are needed to administer the grazing program as they monitor resource conditions, determine annual grazing conditions, prepare Cooperative Agricultural Agreements and Special Use Permits, and coordinate with livestock operators. The grazing permittee would be financially and logistically responsible for installation, maintenance, and removal of range infrastructure and range improvements (i.e., watering facilities, virtual fencing towers, etc.) associated with grazing activities, and for monitoring and rounding up livestock. It is estimated that administering grazing on the refuge will require time from three FTE's (Full Time Employees) and the percentage of time required could vary per FTE. It is expected that grazing could require 5% of the Refuge Manager's time to conduct administrative tasks, 5% of the

Biologist's time for monitoring and assessment, and 5% of the Equipment Operator's time to assist with grazing tasks as needed. Time required may be slightly higher during the first year of grazing. Currently, refuge staff have the capacity to accommodate grazing in a limited area of refuge meadow, as described in this document, as a livestock operator would be responsible for implementing most grazing activities. However, time spent on grazing tasks would result in a reduction of Refuge staff time available to conduct other responsibilities, as described in the Affected Environment, above. Refuge staff would adapt grazing strategies as needed, including whether grazing is offered in any given year, based on future resource conditions and whether the refuge and its partners could sufficiently staff the program and maintain the use in a way that does not degrade refuge resources.

Livestock operators would pay a fee that would be contributed to a National Wildlife Refuge Fund for revenue-sharing payments; alternatively, under a CAA, the Service could accept in-kind services of comparable value in lieu of payment of a portion of the permit fees. At this time there is no foreseeable need for in-kind services to be performed on the Refuge, and lease pricing would be established in the CAA. There would likely be no noticeable change in the refuge budget as a result of implementing grazing within 414 acres of refuge meadow.

Chapter 4: Consultation and Coordination

4.1 Public Involvement

This draft environmental assessment will be available for public review and comment for 21 days. The public will be made aware of this comment opportunity through email notifications to potentially interested parties, such as adjacent landowners, partners, and Federally recognized Tribes. A hard copy of this document will be posted at the Refuge Headquarters at 305 Ruby Valley Road, Ruby Valley, NV 89833-9802. It will be made available electronically on [the refuge website](#). To access the document in an alternative format, contact the refuge. Comments may be submitted in writing via email to FW8PlanComments@fws.gov. Any comments, concerns, suggestions, or other feedback will be incorporated into the final environmental assessment if a substantive response is required.

4.2 State, Federal, and Local Agency Coordination

The State of Nevada has been asked directly to review and comment on the draft environmental assessment.

4.3 Tribal Consultation

The Te-Moak Tribe of Western Shoshone, Duckwater Tribe, Shoshone-Paiute Tribes of Duck Valley, Ely Shoshone Tribe of Nevada, and Confederated Tribes of the Goshute Reservation have been asked directly to review and comment on the draft environmental assessment.

Chapter 5: Certification Statement

The Services prepared this EA pursuant to the NEPA (42 U.S.C. 4321 et seq.), the DOI NEPA Implementing Regulations (43 CFR 46), the DOI Handbook of NEPA Implementing Procedures (516 DM 1), and other applicable Federal and state laws and regulations.

Certification Related to Page Limits: This EA represents the Service's good-faith effort to prioritize documentation of the most important considerations required by the statute within the congressionally mandated page limits; that this prioritization reflects the Service's expert judgment; and that any considerations addressed briefly or left unaddressed were, in the Service's judgment, comparatively not of a substantive nature that meaningfully informed the consideration of environmental effects and the resulting decision on how to proceed.

Certification Related to Deadline: This EA represents the Service's good-faith effort to fulfill NEPA's requirements within the congressional timeline; that such effort is substantially complete; that, in the Service's expert opinion, it has thoroughly considered the factors mandated by NEPA; and that, in the Service's judgment, the analysis contained therein is adequate to inform and reasonably explain Service's decision regarding the proposed Federal action.

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