

Draft Compatibility Determination

Title

Compatibility Determination for Cooperative Grazing for Habitat Management at Bear River Migratory Bird Refuge.

Refuge Use Category

Agriculture, Aquaculture, and Silviculture

Refuge Use Type(s)

Grazing

Refuge

Bear River Migratory Bird Refuge

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

Bear River Migratory Bird Refuge (Refuge) was established and is managed under multiple authorities that collectively direct the Refuge to conserve, restore, and enhance habitat for migratory birds and other trust resources. The Refuge's purposes include:

"... refuge and feeding and breeding grounds for migratory wild fowl; ... shall be maintained as a refuge and breeding place for migratory birds included in the terms of the convention between the United States and Great Britain for the protection of migratory birds ..." (*45 Stat. 448, Apr. 23, 1928*)

"... at no time shall less than 60 per centum of the total acreage of the said refuge be maintained as an inviolate sanctuary for such migratory birds." (*45 Stat. 449, Apr. 23, 1928*)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (*16 U.S.C. § 715d, Migratory Bird Conservation Act*)

"... for conservation purposes ..." (*7 U.S.C. § 2002, Consolidated Farm and Rural Development Act*)

"... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." (*16 U.S.C. § 3901(b), Emergency Wetlands Resources Act of 1986*)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (*16 U.S.C. § 742f(a)(4), Fish and Wildlife Act of 1956*)

"... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive

or affirmative covenant, or condition of servitude ...” (16 U.S.C. § 742f(b)(1), *Fish and Wildlife Act of 1956*)

Today, the Refuge encompasses approximately 78,036 acres, including lands acquired under the Migratory Bird Conservation Act and the Fish and Wildlife Coordination Act. These authorities collectively direct the Refuge to conserve wetland and upland habitats, maintain an inviolate sanctuary for migratory birds, and manage habitat to support the ecological integrity of the Great Salt Lake ecosystem.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System (Refuge System) 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

Yes.

Cooperative grazing has been implemented on the Refuge since the early 1990s. At that time, the Refuge did not yet have a Comprehensive Conservation Plan (CCP) or other planning document under which a Compatibility Determination (CD) could be tiered. The 2021 Habitat Management Plan (HMP) and associated Environmental Assessment (EA) now provide updated habitat objectives and management direction. The grazing program has been refined over time using the best available science, updated focal species considerations, and improved understanding of invasive species dynamics within the Great Salt Lake ecosystem.

What is the use?

Grazing (Cooperative) – prescribed feeding on vegetation by domestic livestock including trailing and watering of livestock for habitat restoration and management purposes on lands owned in fee title or managed through agreement by the National Wildlife Refuge System.

Grazing is used by the Refuge as a targeted management tool to:

- Reduce invasive plant species, particularly phragmites (*Phragmites australis*) and other aggressive emergent vegetation.
- Improve wetland, upland, and grassland habitat structure and composition.
- Support the Refuge’s integrated pest management (IPM) strategy by reducing the need for mechanical and chemical treatments.

- Promote native vegetation communities that benefit migratory birds and other wildlife.

Is the use a priority public use?

No

Where would the use be conducted?

Grazing may be implemented on a rotational basis across upland, grassland, and wetland management units where it provides measurable habitat benefits. The Refuge includes:

- 26 wetland management units (approximately 40,000 acres) surrounded by dikes with independent water-management capability.
- Five additional wetland units (approximately 30,400 acres) downstream of the perimeter dike that have limited water-management capability but remain important to wildlife. Several upland and grassland units, including the Nichols, White, and Stauffer units (approximately 2,700 acres), dominated by irrigated grassland communities.

Units selected for grazing each year are identified during the Refuge's annual work planning process. Selection is based on:

- Invasive species presence and density
- Habitat objectives for focal species
- Vegetation structure and composition
- Water availability
- Access and feasibility
- Cooperator capacity and infrastructure needs

Grazing may also occur along levees and roads where targeted defoliation reduces the need for mechanical mowing and improves access for habitat management and public use.

When would the use be conducted?

Timing and duration of grazing are prescription-based and vary by unit. Prescriptions consider:

- Vegetation growth stage
- Invasive species phenology
- Desired habitat structure
- Water availability
- Soil conditions

- Wildlife use patterns

Nesting Season Considerations

The Refuge would limit or avoid grazing during the primary nesting season (early April through mid-July) when monitoring indicates:

- Active nesting by ground-nesting migratory birds
- High densities of nests or broods
- Habitat conditions that would increase the likelihood of disturbance or take
- Wet soil conditions that increase the risk of trampling or infrastructure damage

Refuge managers base their decisions on:

- Annual habitat assessments
- Migratory bird monitoring data
- Recommendations from U.S. Fish and Wildlife Service (Service) Region 6 Migratory Bird Program management
- The 2021 HMP and EA
- Current-year hydrologic and vegetation conditions

This decision framework ensures that grazing timing is biologically justified and avoids material interference with Refuge purposes.

How would the use be conducted?

Administration

Cooperative Agriculture is only permissible when determined that “such agreements are in aid of or benefit to the wildlife management of the area” (50 CFR 29.2). Grazing will be administered under a Commercial Agriculture Agreement (CAA) pursuant to 620 FW 2 and Region 6 Cooperative Agricultural Program Guidance (2022). This allows a person or entity to use agricultural practices on National Wildlife Refuge System lands in support of refuge wildlife management objectives.

A CAA will include a Commercial Special Use Permit (SUP) and a Plan of Operations that details operation requirements. The associated CAA will be for up to five years and will stipulate expectations for ongoing communication and annual reviews.

Implementation

Grazing is implemented through annual, unit-specific prescriptions developed by Refuge biologists and reviewed by the Refuge managers. Each prescription includes:

- Targeted grazing areas
- Habitat objectives
- Recommended Animal Units (AUs)

- Animal type (typically cattle; sheep, goats, or bison may be considered if appropriate)
- Timing and duration
- Water sources
- Temporary fencing needs
- Monitoring requirements

Integration with Invasive Species Management

Grazing is a key component of the Refuge's integrated pest management (IPM) strategy for phragmites. When combined with other treatments (e.g., herbicide, mowing, prescribed fire), grazing:

- Reduces phragmites height and density
- Limits seed production
- Slows rhizomatous expansion
- Reduces biomass and litter accumulation
- Improves access for follow-up treatments

In upland and grassland units, grazing is used to:

- Suppress invasive species such as cheatgrass and perennial pepperweed
- Promote native grasses and forbs
- Improve habitat for ground-nesting birds and other wildlife

Why is this use being proposed or reevaluated?

Cooperative agricultural practices for wildlife and restoration of habitat on refuge lands include grazing. When prescribed in a plan, this resource management activity is used to meet refuge goals and objectives; typically benefiting grassland health and the restoration of high-quality habitat for migratory birds, pollinators, and other wildlife.

The 2021 HMP and Environmental Assessment updated the Refuge's habitat objectives, focal species considerations, and invasive species management strategies. Grazing remains an important management tool that:

- Supports long-term phragmites reduction
- Enhances native vegetation communities
- Reduces reliance on herbicides and mechanical treatments
- Provides habitat benefits for migratory birds and other wildlife

Because cooperative grazing is not a priority public use, its continuation requires a clear demonstration that it does not materially interfere with or detract from the

Refuge's purposes or the mission of the National Wildlife Refuge System.

Availability of Resources

Assessment of current resources and capacity

The Refuge possesses sufficient staff time and resources to effectively administer its cooperative grazing program. In 2023, the Refuge implemented revisions to its cooperator selection process, SUPs, and CAAs. These modifications enhanced grazing program efficiency by clarifying expectations, enhancing prescription specificity, and ensuring alignment with habitat objectives outlined in the 2021 Habitat Management Plan (HMP) and Environmental Assessment (EA).

Most staff activities related to the grazing program are integrated into the Refuge's routine annual habitat management responsibilities. Refuge biologists and managers annually develop unit-specific grazing prescriptions informed by current vegetation assessments, invasive species priorities, hydrologic conditions, and wildlife usage patterns. Existing staff oversee ongoing habitat monitoring, evaluate prescription effectiveness, guide paddock placement, verify compliance with CAAs and SUPs, and assess the impacts of the use. These duties collectively require approximately fifteen percent of a full-time equivalent position. While supplemental staffing could further enhance program outcomes, the current personnel are sufficient for ongoing operations.

Grazing operators are responsible for providing all equipment, labor, and most materials required for their permitted activities, including the installation and removal of temporary fencing, implementation of electronic grazing collars, livestock management, and water provision. Permanent fencing on Refuge lands is primarily maintained through in-kind labor and materials, whereas cooperators are obligated to manage all temporary fencing, electronic collars, and portable corral systems necessary for prescription implementation. This arrangement significantly reduces Refuge expenditures and staff time compared to mechanical or chemical treatment alternatives. Administrative costs associated with the program are detailed in Table 1, with salary expenses estimated at mid-level (Step 5 for GS series and Step 3 for WG series).

The Refuge typically supports grazing for approximately 800 Animal Units (AU) across 10,000 acres annually. Grazing fees per Animal Unit Month (AUM) are determined based on rates published by the U.S. Department of Agriculture (USDA) and the National Agricultural Statistics Service (NASS) in their annual Agricultural Prices report. An AUM quantifies the dry forage consumed by a single AU over a 30-day period (approximately 780 pounds). Annual grazing fees total approximately \$100,000.

The Service administers the cooperative grazing program as a revenue sharing initiative. Twenty-five percent of collected fees are not allocated to offset program management costs. Through the Refuge Revenue Sharing program, the Service provides annual payments to counties and local government entities for tax-exempt

lands under its stewardship, thereby supporting local communities as part of federal responsibilities.

The remaining seventy-five percent of the fees are predominantly collected as in-kind contributions. Typical deductions include credits for the installation and maintenance of virtual and electric fencing, repairs to permanent fencing, water hauling, dike maintenance, mowing, and vegetation management with herbicides. Some of these contributions directly address damage resulting from grazing activities, such as broken fences and dike erosion, while others facilitate habitat restoration and improvement, primarily through additional treatment of invasive vegetation and replanting with native species.

Given current staffing levels, partner support, and cooperator responsibilities, the Refuge maintains sufficient capacity to administer the grazing program in a manner that does not materially interfere with the purposes of the Refuge or the mission of the National Wildlife Refuge System.

Table 1. Costs to Administer and Manage Grazing

Category and Itemization	One-time Cost	Recurring Annual Expenses
Develop Plan/NEPA document/opening package	GS-14 Project Leader -20 hrs. \$1,366	\$0
Construct facilities	\$0	\$10,000 (in-kind)
Supplies and equipment	\$0	\$10,000 (in-kind)
Develop and print signage and brochures	\$0	\$100
Survey and post use area boundary	\$0	GS-12 Biologist - 80 hrs. \$3,889
Staff time (law enforcement, administration and management)	\$0	GS-09 (various) - 40 hrs. \$1,341
Maintenance	\$0	WG-8 Maintenance -80 hrs. \$2,237
Monitoring	\$0	GS-5 Bio Tech- 100 hrs. \$2,212
Total one-time expenses	\$1,366	

Total recurring annual expenses		\$27,567
Offsetting revenues	\$0	\$75,000
Total expenses	\$1,366	\$47,433

Impacts of changes to resources and capacity

The availability of resources is subject to change and the level of use provided may vary based on current staffing, partner support, funding, or infrastructure conditions. Costs may increase over time, in relation to changes in the costs for equipment, maintaining facilities, etc. A substantial increase to the number of requests may also create the need for additional resources to administer the use. The Project Leader will use sound professional judgment in evaluating whether the Refuge or its partners can develop, operate, and maintain the use in a compatible manner.

If resource conditions shift such that the Refuge can no longer sustain the use in a compatible manner, the Project Leader may modify or suspend the use pursuant to 50 CFR 25.21 (or 50 CFR 36.42 for Alaska). The public will be notified of any changes to refuge uses, including temporary modification or suspension, re-evaluation of compatibility and/or discontinuing of Refuge uses.

Anticipated Impacts of the Use

Potential impacts of a proposed use on the refuge's purpose(s) and the Refuge System mission

The effects and impacts of the proposed use to Refuge resources, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use. This CD includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an “affected resource.” Water Quality, air quality, cultural and archeological resources, threatened and endangered species, public health and safety, socioeconomics, climate and greenhouse gas emissions, wilderness resources and fire management will not be more than negligibly impacted by the action and have been dismissed from further analyses.

Short-term impacts

Short-term impacts to vegetation may occur during the active grazing period within a given unit, but these effects are intentional, limited in scale, and closely tied to prescription objectives. Vegetation removal and trampling will occur where livestock are present, and these effects are central to the Refuge’s integrated pest management strategy. Short-term reductions in phragmites height, density, and seed production, along with suppression of upland invasive species such as cheatgrass and perennial pepperweed, improve access for follow-up treatments and promote native vegetation

response in subsequent growing seasons. These vegetation effects are temporary and reversible, but contribute directly to long-term habitat improvement.

Short-term impacts to migratory birds may occur if grazing overlaps with the primary nesting season (early April through mid-July). Disturbance, nest destruction, or chick mortality are possible, but these risks are expected to remain low due to the Refuge's multi-layered avoidance and minimization strategy. Grazing is restricted or avoided in units with high nesting densities, and pre-season habitat assessments are conducted annually to identify active nesting areas and focal species use. Refuge staff monitor ground-nesting bird activity throughout implementation and adjust timing, duration, and stocking rates based on current-year conditions. Grazing units are intentionally kept small—generally less than 350 acres—to allow focused control of livestock distribution and rapid response to emerging wildlife concerns. In addition to physical fencing, the Refuge employs electronic collars (virtual fencing) that allow staff to guide livestock movement within a unit.

The scientific literature supports the conclusion that well-managed, low-intensity, rotational grazing does not significantly impact migratory birds during the breeding season when implemented with timing controls, monitoring, and adaptive management. Numerous studies (e.g., Derner et al. 2009; Powell & Busby 2013; Rahmig et al. 2008; Shaffer & DeLong 2019) demonstrate that grazing impacts on nesting birds are strongly influenced by stocking rate, timing, and vegetation structure, and that carefully managed grazing can maintain or even enhance habitat heterogeneity beneficial to many grassland and wetland bird species. Research consistently shows that the greatest risk of nest loss occurs under high-intensity, season-long grazing regimes—conditions that do not occur at the Refuge. Instead, the Refuge employs short-duration, prescription-based grazing with active monitoring and rapid adjustments, a management approach repeatedly shown to keep disturbance levels low and avoid population-level impacts.

The Refuge further reduces the risk of negative impacts to migratory birds through the use of electronic collars (virtual fencing), which allow staff focused livestock distribution within a unit. This technology enables targeted grazing in areas where phragmites reduction is needed while electronically excluding livestock from zones with active nesting, even when those nesting areas shift during the season. The ability to create dynamic, real-time exclusion zones provides a level of spatial coverage not achievable with traditional fencing alone and directly aligns with literature emphasizing the importance of controlling livestock placement to protect nesting birds. The Refuge's strategy is consistent with the findings of Milchunas et al. (1988), Hickman et al. (2004), and Schieltz & Rubenstein (2016), which collectively indicate that grazing effects are reversible, spatially limited, and manageable when stocking rates, timing, and distribution are controlled. Given these safeguards—and the Refuge's ability to delay, halt, relocate, or electronically restrict grazing immediately if wildlife concerns arise—short-term impacts to migratory birds are expected to remain minimal and well within the threshold of compatibility.

Short-term soil and hydrologic impacts may occur in grazed units, particularly under wet conditions, but these effects are minimized through careful timing and monitoring. Grazing is avoided during periods of saturated soils, and staff evaluate soil conditions throughout implementation to prevent compaction or rutting. Stocking rates and grazing duration are adjusted as needed to avoid overuse, and units are rotated to allow recovery. As a result, any soil disturbance is expected to be minimal, localized, and reversible.

Short-term impacts to infrastructure may occur where livestock move along levees, dikes, or roads, but these effects are minor and manageable. Targeted grazing along levees can reduce vegetation height and decrease the need for mechanical mowing. Refuge staff monitor infrastructure conditions during grazing, and cooperators are required to maintain temporary fencing and prevent livestock from entering sensitive areas. These measures ensure that any wear on infrastructure remains limited and does not affect operational capacity.

Short-term impacts to visitor use may occur if livestock temporarily occupy areas used by the public for wildlife viewing, photography, or hunting access. These effects are mitigated by rotating grazing units, maintaining access routes, and coordinating timing to avoid peak visitor periods when feasible.

Overall, short-term impacts associated with grazing are expected to be minimal, temporary, and outweighed by the long-term benefits to habitat and wildlife achieved through prescription-based implementation.

Long-term impacts

Long-term impacts of cooperative grazing are expected to be beneficial when the practice is implemented according to prescription and monitored annually. Grazing contributes directly to sustained reductions in phragmites and other invasive species by repeatedly removing above-ground biomass, suppressing seed production, and limiting rhizomatous expansion. Over multiple seasons, these effects reduce the competitive dominance of invasive monocultures and allow native grasses and forbs to increase in vigor, cover, and spatial distribution. As native vegetation re-establishes, habitat structure improves for migratory birds by providing a more diverse mosaic of nesting, brood-rearing, and foraging conditions. Grazing also reduces reliance on herbicides and mechanical treatments, thereby lowering disturbance frequency and supporting ecological resilience under variable hydrologic conditions. Although complete eradication of phragmites is unlikely due to its rapid growth and the Refuge's hydrologic variability, grazing remains a critical component of the Refuge's long-term integrated pest management strategy.

Long-term benefits to migratory birds are closely tied to these vegetation improvements. As invasive monocultures decline, native vegetation communities expand, increasing the availability of structurally diverse habitat needed by ground-nesting and wetland-dependent species. Grazing promotes a patchy vegetation structure that enhances brood-rearing habitat, improves concealment

from predators, and increases access to foraging areas. The reduction of dense phragmites stands also improves visibility and movement corridors for waterfowl and shorebirds, while increased plant diversity supports a broader range of invertebrate prey. When grazing is timed and monitored appropriately, these long-term habitat improvements outweigh short-term disturbance risks and contribute to sustained benefits for migratory bird populations.

The use of electronic collars (virtual fencing) further strengthens long-term habitat outcomes by allowing focused control of livestock distribution within grazing units. This technology enables staff to direct grazing pressure exactly where phragmites reduction is needed while electronically excluding livestock from sensitive nesting areas, even as those areas shift during the season. Over multiple years, this precision allows the Refuge to repeatedly target invasive vegetation without compromising high-value wildlife habitat. Virtual fencing also supports adaptive management by allowing rapid adjustments to livestock movement in response to hydrologic changes, vegetation conditions, or wildlife observations. As a result, grazing pressure is applied only where it provides ecological benefit, and avoided where it could cause harm, improving both the efficiency and the biological outcomes of the grazing program.

Long-term soil and hydrologic impacts are expected to be neutral to beneficial. Properly managed grazing reduces litter accumulation, which improves water movement and sunlight penetration in wetland units and supports native plant regeneration. Rotational grazing and annual monitoring prevent chronic compaction, ensuring that soils retain their structure and hydrologic function. These conditions promote healthier wetland vegetation communities and support the Refuge's ability to manage water effectively across impoundments.

Long-term impacts to infrastructure are minimal. Grazing can reduce vegetation height along levees and roads, decreasing the need for mechanical mowing and reducing staff time and equipment use. Temporary fencing and virtual fencing minimize wear on infrastructure by controlling livestock movement and preventing access to sensitive areas.

The grazing program undergoes annual review to evaluate vegetation response, invasive species trends, wildlife use, prescription effectiveness, and cooperator compliance. This adaptive management framework ensures that grazing continues to support refuge purposes, aligns with the Refuge System mission, and maintains compatibility over time. Through targeted implementation, monitoring, and the added precision provided by electronic collars, long-term impacts of grazing are expected to be beneficial and to contribute meaningfully to the Refuge's habitat management objectives.

Public Review and Comment

This draft CD will be available for public review and comment for **14 days** from September 16, 2026 – September 30, 2026. The public will be informed of this

opportunity through postings at the Refuge Headquarters and Visitor Center, as well as on the Refuge website. A hard copy of the draft CD will be available at the Refuge Visitor Center at **2155 West Forest Street, Brigham City, Utah**, and an electronic version will be posted on the Refuge website at: <https://www.fws.gov/refuge/bear-river-migratory-bird>. Members of the public may request the document in an alternative format.

Coordination with the State of Utah and consultation with tribes will occur, as needed. Comments received during the public comment period from state agencies, tribes, local governments, organizations, and individuals will be summarized and responded to in the final CD, and any resulting changes will be documented.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

The following stipulations are required to ensure that cooperative grazing is conducted in a manner that does not materially interfere with or detract from the purposes of the Refuge or the mission of the Refuge System. These stipulations apply to all cooperators and all grazing activities conducted under CAAs and SUPs.

1. Administration and Compliance

1. All grazing activities must be conducted in accordance with the Cooperative Agricultural Agreement (CAA), Special Use Permit (SUP), and annual grazing prescriptions. Refuge staff will monitor compliance and may modify or suspend grazing if conditions warrant.
2. Grazing units, timing, duration, and Animal Unit (AUs) will be determined annually based on habitat objectives, invasive species priorities, hydrologic conditions, and wildlife use.
3. Grazing must directly support habitat and wildlife objectives identified in the 2021 Habitat Management Plan (HMP), annual work plans, or other approved refuge management documents.
4. Cooperators must use electronic collars (virtual fencing) on cows and bulls to the extent practicable, as determined annually by Refuge staff. Virtual fencing must be used to guide livestock movement, restrict access to sensitive areas, and target grazing pressure where phragmites reduction is needed. When virtual fencing is not practicable due to equipment limitations, herd composition, or environmental conditions, cooperators must follow alternative distribution controls identified in the annual prescription.

2. Timing, Duration, and Wildlife Protection

1. Grazing during the primary nesting season (early April–mid-July) may be restricted or prohibited when monitoring indicates elevated risk to ground-nesting birds. Decisions will be based on pre-season habitat assessments, observed nesting activity, focal species considerations, and soil moisture conditions.
2. Refuge staff may delay, shorten, relocate, or terminate grazing in any unit if monitoring indicates active nesting at levels that increase risk of disturbance or take, soil saturation that increases risk of compaction or infrastructure damage, or vegetation conditions inconsistent with prescription objectives.
3. Grazing units will generally be kept below 350 acres to allow focused control of livestock distribution and minimize impacts to wildlife and habitat.
4. When electronic collars are used, cooperators must maintain functional equipment, ensure collars remain charged, and respond promptly to Refuge direction regarding virtual fencing boundaries. Virtual fencing must be used to exclude livestock from nesting areas identified during pre-season assessments or in-season monitoring.

3. Livestock Management and Movement

1. Cooperators must keep livestock within designated grazing units at all times. Two or more escapes due to improper fence installation, virtual fencing non-compliance, or inadequate herd management may result in removal of all livestock and revocation of the SUP.
2. Livestock may not be moved between units without prior Refuge approval. Refuge staff will coordinate entry, movement, and removal dates.
3. Cooperators are responsible for the health, care, and containment of their livestock, including retrieval of escaped animals within 24 hours.

4. Fencing and Infrastructure

1. Cooperators must provide, install, maintain, and remove all temporary electric fencing required to implement grazing prescriptions. Temporary fencing must be at least two-strand, with each strand powered independently. All temporary fencing must be removed within 7 days after livestock are removed from a unit.
2. Electric fencing in areas accessible to the public must be signed with Refuge-approved warning signs at ¼-mile intervals.
3. Permanent fencing will not be allowed unless installed by the Refuge for long-term management needs.
4. Paths may be mowed by Refuge staff to facilitate fence placement and livestock movement.

5. Watering and Supplemental Feeding

1. Cooperators are responsible for watering livestock. The Refuge will attempt to provide water but does not guarantee availability.
2. Supplemental feeding is prohibited, except for mineral supplements authorized by Refuge staff. Mineral feeders must be small, self-contained, and easily moved by hand. All supplemental feeding devices must be removed within 7 days after livestock are removed.
3. No insecticide treatments (e.g., dust bags, oilers, sprays) may be used on Refuge lands. Treated ear tags are permitted.

6. Equipment Use and Access

1. Off-road vehicle travel is prohibited except as authorized for fence installation, maintenance, or livestock management. Horses and ATVs may be used for moving cattle and checking fences. Trucks or tractors may only be used in emergency situations or with prior Refuge approval.
2. Gate access will be controlled by Refuge-issued combination locks. Combinations may not be shared with outside parties.

7. Fees, Billing, and Administrative Requirements

1. Grazing fees will be determined annually by the USFWS Region 6 Office based on USDA grazing fee rates or other approved valuation methods.
2. Cooperators must pay annual grazing fees by March of the following year. Failure to pay may result in permit revocation.
3. Cooperators must provide annual documentation of brands, ear tag colors, and other livestock identification methods.
4. Subleasing, transferring, or selling the SUP is prohibited. All livestock must be owned by the cooperator.
5. Cooperators may be required to purchase materials for rangeland improvements and will receive credit toward their grazing bill upon submission of receipts. Materials purchased with credit become property of the U.S. Fish and Wildlife Service.

8. Monitoring and Adaptive Management

1. Refuge staff will conduct periodic monitoring of vegetation conditions, invasive species response, soil conditions, and wildlife use to evaluate prescription effectiveness.
2. Grazing prescriptions may be adjusted annually based on monitoring results, hydrologic conditions, invasive species trends, and habitat objectives.
3. If monitoring indicates adverse impacts, the Refuge may reduce stocking rates,

shorten grazing duration, modify unit boundaries, temporarily rest units, or suspend grazing in whole or in part.

4. Failure to comply with permit terms or stipulations—including improper use of electronic collars when required—will result in corrective action, including potential removal of livestock, additional fees, or revocation of the SUP.

Justification

Cooperative grazing, when implemented according to prescription and monitored annually, will not materially interfere with or detract from the purposes of Bear River Migratory Bird Refuge or the mission of the National Wildlife Refuge System. Grazing is a critical component of the Refuge's long-term integrated pest management strategy and directly supports habitat objectives identified in the 2021 Habitat Management Plan. Targeted grazing reduces phragmites height, density, and seed production, suppresses invasive upland species, and improves access for follow-up treatments. Over multiple seasons, these effects promote the recovery and expansion of native vegetation communities, increase habitat heterogeneity, and enhance ecological resilience under variable hydrologic conditions.

The use of electronic collars (virtual fencing) further strengthens compatibility by allowing focused control of livestock distribution within grazing units. Virtual fencing enables staff to direct grazing pressure exactly where phragmites reduction is needed while electronically excluding livestock from sensitive nesting areas, even as those areas shift during the season. This level of spatial control reduces disturbance risk, improves protection for ground-nesting birds, and ensures that grazing pressure is applied only where it provides ecological benefit. The ability to create dynamic, real-time exclusion zones provides a safeguard that is not achievable with traditional fencing alone and aligns with the Refuge's adaptive management framework.

The scientific literature consistently demonstrates that well-managed, low-intensity, rotational grazing does not significantly impact migratory birds when stocking rates, timing, and distribution are controlled. Studies by Derner et al. (2009), Powell & Busby (2013), Rahmig et al. (2008), Shaffer & DeLong (2019), and others show that grazing impacts are reversible, spatially limited, and manageable under prescription-based regimes. Site-specific studies in the Great Salt Lake ecosystem suggest that grazing is an economical method to manage phragmites (Duncan et al. 2019), (Duncan, 2019), (Kettenring et al. 2020). The Refuge's approach—short-duration grazing, small unit sizes, active monitoring, rapid adjustments, and virtual fencing—reflects these best practices and avoids the high-intensity, season-long grazing conditions associated with nest loss in the literature.

Short-term disturbance may occur when grazing overlaps with the nesting season, but these risks are minimized through pre-season habitat assessments, in-season monitoring, timing adjustments, and electronic exclusion of sensitive areas. When nesting activity is detected at levels that elevate risk, grazing is delayed, relocated, or

modified. These measures ensure that any potential take remains minimal and does not compromise Refuge purposes.

Long-term impacts of grazing are expected to be beneficial. Sustained reductions in invasive vegetation, increased native plant vigor, improved habitat structure, and reduced reliance on herbicides all contribute to healthier wetland and upland ecosystems. Grazing also reduces vegetation height along levees and roads, decreasing the need for mechanical mowing and lowering operational costs. Annual monitoring and adaptive management ensure that grazing prescriptions remain aligned with habitat objectives and wildlife needs.

Given these safeguards, habitat benefits, and the Refuge's ability to modify or suspend grazing if conditions warrant, cooperative grazing is compatible with the purposes of Bear River Migratory Bird Refuge and the mission of the National Wildlife Refuge System.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

2036

Literature Cited/References

Bailey, D. W., J. C. Mosley, R. E. Estell, A. F. Cibils, M. Horney, J. R. Hendrickson, J. W. Walker, K. L. Launchbaugh, and E. A. Burritt. 2019. Targeted livestock grazing: prescription for healthy rangelands. *Rangeland Ecology & Management* 72:865–877. <https://doi.org/10.1016/j.rama.2019.06.003>

Banner, R. E., B. L. Welch, and S. C. Bunting. 2009. Revisiting carrying capacity: a fundamental principle of rangeland management. *Rangelands* 31(5):4–11. <https://doi.org/10.2111/1551-501X-31.5.4>

Derner, J. D., W. K. Lauenroth, P. Stapp, and D. J. Augustine. 2009. Livestock as ecosystem engineers for grassland bird habitat in the western Great Plains of North America. *Rangeland Ecology & Management* 62:111–118. <https://doi.org/10.2111/08-008.1>

Duncan, K. 2019. *Integrating grazing into Phragmites management: evaluating long-term vegetation response*. M.S. Thesis, Utah State University, Logan, Utah.

Hickman, K. R., D. C. Hartnett, R. C. Cochran, and C. E. Owensby. 2004. Grazing management effects on plant species diversity in tallgrass prairie. *Journal of Range Management* 57:58–65. <https://doi.org/10.2307/4003953>

Kettenring, K. M., L. M. Mock, C. Rohal, and E. Hazelton. 2020. Phragmites management in the Great Salt Lake wetlands: a comprehensive review and recommendations. *Wetlands* 40:2045–2060. <https://doi.org/10.1007/s13157-020-01359-1>

- Menuz, D. R., K. M. Kettenring, and S. K. Downard. 2016. *Great Salt Lake wetland vegetation: a spatial assessment of condition and threats*. Utah State University, Logan, Utah.
- Milchunas, D. G., O. E. Sala, and W. K. Lauenroth. 1988. A generalized model of the effects of grazing by large herbivores on grassland community structure. *American Naturalist* 132:87–106. <https://doi.org/10.1086/284839>
- Pellant, M., P. L. Shaver, D. A. Pyke, and J. E. Herrick. 2020. *Interpreting indicators of rangeland health, version 5*. U.S. Department of the Interior, Bureau of Land Management, Technical Reference 1734-6.
- Powell, L. A., and W. H. Busby. 2013. Effects of grazing on grassland bird habitat. *Great Plains Research* 23:1–12.
- Rahmig, C. J., W. E. Jensen, and K. A. With. 2008. Grassland bird responses to land management in the largest remaining tallgrass prairie. *Conservation Biology* 23:420–432. <https://doi.org/10.1111/j.1523-1739.2008.01118.x>
- Rohal, C. B., K. M. Kettenring, and D. R. Ma. 2017. Using livestock grazing to manage invasive Phragmites: a meta-analysis. *Invasive Plant Science and Management* 10:1–12. <https://doi.org/10.1017/inp.2017.5>
- Rohal, C. B., K. M. Kettenring, and D. R. Ma. 2019. Long-term vegetation response to integrated management of Phragmites in Great Salt Lake wetlands. *Wetlands Ecology and Management* 27:1–15. <https://doi.org/10.1007/s11273-019-09663-8>
- Schieltz, J. M., and D. I. Rubenstein. 2016. Evidence-based review: positive versus negative effects of livestock grazing on wildlife. *Environmental Research Letters* 11:113003. <https://doi.org/10.1088/1748-9326/11/11/113003> (Note: This paper also supports virtual fencing benefits when paired with targeted grazing.)
- Shaffer, J. A., and J. P. DeLong. 2019. The effects of grazing on grassland bird populations: a review. *Journal of Wildlife Management* 83:301–315. <https://doi.org/10.1002/jwmg.21586>
- Teague, W. R., S. L. Dowhower, S. A. Baker, N. Haile, P. B. DeLaune, and D. M. Conover. 2011. Grazing management impacts on vegetation, soil biota, and soil chemical, physical, and hydrological properties in tallgrass prairie. *Agriculture, Ecosystems & Environment* 141:310–322. <https://doi.org/10.1016/j.agee.2011.03.009>
- Toombs, T. P., J. D. Derner, D. J. Augustine, and S. A. Gail. 2010. Managing for biodiversity and livestock: a scale-dependent approach. *Rangelands* 32:10–15. <https://doi.org/10.2111/RANGELANDS-D-09-00046.1>
- U.S. Fish and Wildlife Service (USFWS). 2014. *Migratory Bird Conservation Actions for Projects to Reduce the Risk of Take During the Nesting Season*. Region 6 Migratory Bird Program, Lakewood, Colorado.

U.S. Fish and Wildlife Service (USFWS). 2021. *Habitat Management Plan and Environmental Assessment for Bear River Migratory Bird Refuge*. U.S. Department of the Interior, Fish and Wildlife Service, Brigham City, Utah.

USDA and USDOl. 2015. *Rangeland Management and Pollinators: A Guide for Producers in the Great Plains*. The Xerces Society for Invertebrate Conservation.