Chapter 6—Implementation of the Proposed Action (Draft Plan)

Ann Hough / FWS

Teton Mountain Range

This chapter contains the specific objectives and strategies that would be used to carry out our proposed action (alternative D), which reflects the draft CCP for the National Elk Refuge. We are recommending this as the alternative that could best achieve the refuge's purposes, vision, and goals while helping to fulfill the Refuge System mission. The stepdown management plans listed in section 6.11 near the end of the chapter would provide implementation details for specific refuge programs. In addition, appendix F contains the draft compatibility determinations (required) for public and management uses associated with the draft CCP.

If the Regional Director selected alternative D as the preferred alternative, the objectives and strategies presented in this chapter would become the final plan to be carried out over the next 15 years. The CCP would serve as the primary management document for the refuge until it is formally revised. We would carry out the final CCP with help from partner agencies, organizations, and the public.

As stated in the Improvement Act, the primary mission of our Refuge System is wildlife conservation. Multiple policies and guidance documents have been developed to accomplish this mission, including the policy on biological integrity, diversity, and environmental health and the 2011 "Conserving the Future" document developed in collaboration with our stakeholders and the public. The biological integrity, diversity, and environmental health policy provides directives for maintaining and restoring the biological integrity, diversity, and health of the Refuge System, whereas "Conserving the Future" articulates the desired roles for refuges and provides recommendations for the next decade and beyond (FWS 2011). This document states, "At the root of

these challenges [that the Refuge System must address] is the increasing consumption of natural resources, which has caused loss, degradation and fragmentation of habitat around the world. Habitat loss is largely responsible for the current extinction event, in which the Earth may lose half of its species in the next 100 years."

This chapter describes the management focus of this draft plan (alternative D, the proposed action), followed by the objectives and strategies to achieve the refuge goals. The last sections of the chapter describe the staff needed to carry out the plan (section 6.10), stepdown management plans (section 6.11), monitoring and evaluation (section 6.12), and plan amendment and revision (section 6.13).

6.1 Management Focus

Our focus and planning approach for the National Elk Refuge is consistent with the visions and principles promoted in the Improvement Act; the policy on biological integrity, diversity, and environmental health; and "Conserving the Future." This includes conserving native communities and species of concern and developing "quantifiable objectives" that "integrate the conservation needs of the larger landscape (including the communities they support)."

Vision for the National Elk Refuge

Nestled below the majestic Teton Range, adjacent to the historic gateway town of Jackson, the National Elk Refuge provides crucial big game wintering habitat in the Greater Yellowstone Ecosystem. Across the refuge's grassland, wetland, woodland, and sagebrush shrubland communities, visitors view wintering elk and other wildlife populations that are balanced with their habitats. The public enjoys quality hunting and fishing as well as year-round interpretative opportunities. Effective outreach and strong public and private partnerships ensure understanding and protection of refuge resources for future generations.

Promote Natural Habitats and Enhance Public Use

The vision, proposed action alternative, and goals for the National Elk Refuge collectively focus objectives and associated management strategies on achieving sustainable, diverse, native communities that would conserve native species of concern at landscape and local scales. Achieving this vision represents the greatest contribution we at the refuge can make in addressing current and future threats to natural resources in the Greater Yellowstone Ecosystem. Threats include, but are not limited to, increasing habitat fragmentation and decreasing landscape connectivity, adverse effects on water quantity and quality, and cumulative risks associated with a changing climate and energy production. To alleviate these risks and to meet the purposes of the refuge require us to consider multiple perspectives:

- Refuge System policies and guidance
- the current understanding of native community ecology
- increasing human demands on natural resources
- continued landscape change
- our need to collaborate with the public and our partners on projects that extend beyond refuge boundaries

6.2 Overview of Goals and Objectives

Under each goal in this section, we describe the objectives and strategies that would serve as the steps needed to achieve the refuge vision. While a goal is a broad statement, an objective is a concise statement that indicates what is to be achieved, the extent of the achievement, who is responsible, and when and where the objective should be achieved—all to address the goal. The strategies are the actions needed to achieve each objective. Unless otherwise stated, the refuge staff would carry out the actions in the objectives and strategies. The rationale for each objective provides context such as background information, assumptions, and technical details. The plan has objectives for the following:

6.3 Climate Change
6.4 Landscape-Scale Conservation
6.5 Habitat and Wildlife Goal
6.6 Cultural Resources Goal
6.7 Visitor Services Goal
6.8 Visitor and Employee Safety and Resource Protection Goal
6.9 Administration Goal

6.3 Climate Change

The following objectives deal with our involvement in the landscape-scale and local aspects of climate change.

Climate Change Objective 1

For the life of the plan, continue involvement with partner organizations, especially land management agencies in the Greater Yellowstone Coordinating Committee, to stay apprised of the developing science of climate change and the resulting information that can have Greater Yellowstone Ecosystem–wide application.

Strategies

- Take part in climate change conferences, webinars, and seminars.
- Engage in the Greater Yellowstone Coordinating Committee's climate change planning efforts.

Rationale

The refuge's limited staff would make it difficult for the refuge to remain current with the ever-growing knowledge of climate change and to conduct land management planning that reflects the latest science. The refuge could leverage our limited biological staff by staying involved with and relying on other Federal land management units in the Greater Yellowstone Coordinating Committee with large staffs to develop climate change expertise and coordinate ecosystem-wide planning efforts.

Climate Change Objective 2

For the life of the plan, participate in the climate change assessments and long-term monitoring efforts initiated by the Greater Yellowstone Coordinating Committee.

Strategies

- Conduct vulnerability assessments on the refuge that correspond and complement efforts of the Greater Yellowstone Coordinating Committee in predicting climate change effects.
- Collect long-term monitoring data for key habitats and wildlife populations, focusing on surrogate species when possible. (Note: Surrogate species is a recently adopted but yet to be implemented planning approach for the Refuge System. Surrogate species represent the needs of a wide array of wildlife species, and these needs will be used for conservation planning that supports multiple species and habitats within a defined landscape or geographic area.)

Rationale

Cooperation and coordination with surrounding Federal land management agencies through the Greater Yellowstone Coordinating Committee would enable us to collect long-term monitoring information that complements and adds value to ecosystem-wide efforts. Participation in climate change assessments conducted by other land management agencies on the committee would give the refuge the analysis expertise to address refuge-specific concerns.

Climate Change Objective 3

For the life of the plan, carry out mitigation actions identified in the Greater Yellowstone Area climate action plan (Fiebig 2011) to reduce the refuge's carbon footprint.

Strategies

- Continue to improve the energy efficiency of buildings and the vehicle fleet.
- Use a gravity-flow irrigation system to reduce the energy-related costs of pumping.

Rationale

The Greater Yellowstone Coordinating Committee completed a comprehensive assessment of greenhouse gas emissions and corresponding mitigation plans for each Federal land management unit in the Greater Yellowstone Ecosystem. Following the specific mitigation recommendations for the refuge would reduce our carbon footprint. Reduction of greenhouse gas emissions would support the goals of our agency's "Strategic Plan for Responding to Accelerating Climate Change, 2009" (FWS 2010).

6.4 Landscape-Scale Conservation

The following objectives describe our responsibilities for involvement in landscape-scale conservation.

Landscape-Scale Conservation Objective 1

For the life of the plan, participate in the Greater Yellowstone Coordinating Committee to support landscape-scale conservation in the Greater Yellowstone Ecosystem.

Strategies

- Participate on the board and committees of the Greater Yellowstone Coordinating Committee.
- Contribute money as available toward priority projects that provide ecosystem-wide benefits.
- Share information and resources such as equipment and staff.

Rationale

Working with others would improve our ability to coordinate management of Federal lands at a landscape scale.

Landscape-Scale Conservation Objective 2

Within 5 years, determine the feasibility of a Service conservation easement program, and if appropriate, pursue authority for conservation easements in Teton County.

Strategies

- Inventory and identify tracts of high biological value that support the refuge vision.
- Develop a preliminary project proposal.
- Develop a land protection plan.

Rationale

Off-refuge resources and activities affect our ability to achieve refuge goals. Wildlife often travel across administrative boundaries to meet their seasonal life cycle needs. Protection of off-refuge resources would help meet these seasonal wildlife needs.

Landscape-Scale Conservation Objective 3

For the life of the plan, work with partners to use non-Service (private, nongovernmental organization, or other agency) easements to support refuge-specific conservation goals in the CCP and Bison and Elk Management Plan.

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Spotted Sandpiper

Strategies

- Set up a program with the Jackson Hole Land Trust and others to establish conservation easements with refuge-specific conservation goals.
- Consider partnership opportunities to build wildlife crossings for Highway 89.

Rationale

Off-refuge resources and activities affect our ability to achieve refuge goals. Wildlife often travel across administrative boundaries to meet their seasonal life cycle needs. Protection of off-refuge resources would help meet these seasonal wildlife needs. Use of privately funded wildlife and habitat protection easements might be more desirable to some landowners than Government-funded easements. Furthermore, private money might be available to finance easement programs when Government money was unavailable. Wildlife crossings could reduce collisions between vehicles and animals.

Landscape-Scale Conservation Objective 4

Within 10 years, evaluate potential land exchanges with adjacent landowners (agencies and private landowners) to change the refuge boundary to improve the effectiveness of refuge programs.

Strategies

- Discuss potential land exchanges with adjacent landowners.
- Prioritize tracts for different refuge goals such as bison, elk, swan, bald eagle, or greater sage-grouse.

Rationale

Identifying and obtaining tracts of land that could improve wildlife benefits under our management would support refuge purposes. Some areas like the northeastern part of the refuge might better fit with other agency missions and provide benefits to the public (lands are managed by agencies according to different missions and policies).

Landscape-Scale Conservation Objective 5

Within 10 years, evaluate the effects of the potential sale of Wyoming State trust lands and Wyoming Game and Fish Commision-owned lands near the refuge and consider protection options.

Strategy

- Work with local community to share information and effects.

Rationale

The potential sale of State of Wyoming lands next to or near the refuge to private landowners might have serious consequences to the management of the National Elk Refuge. Before lands are under consideration for sale, the refuge needs to determine and address the possible effects of access, rights-of-way, and human disturbance to elk and bison herds during sensitive winter and spring seasons.

6.5 Habitat and Wildlife Goal

Adaptively manage bison, elk, and other wildlife populations and habitats as outlined in the Bison and Elk Management Plan. Contribute to the conservation of healthy native wildlife populations and their habitats. Restore and sustain a native fishery that provides quality fishing opportunities.

Native Grasslands Objective

Within 10 years, manage 500–1,000 acres of native grassland habitat on northern end of the refuge to increase elk and bison use of these areas.

Strategies

- Use wildland fire to help accomplish the objective and reduce hazardous fuel.
- Control invasive plant species.
- Seed sites with desired plant species.

Rationale

The Bison and Elk Management Plan calls for reduced reliance on supplemental feeding. Encouraging elk and bison use of grassland habitats on the northern end of the refuge would reduce forage use and conserve forage on the southern end of the refuge, reducing the need for supplemental feeding.

Sagebrush Shrublands Objective 1

Within 5 years, define existing structural characteristics of sagebrush shrubland communities on the refuge, and protect existing sagebrush shrubland communities from disturbance or degradation.

Strategies

- Cooperate with other agencies to obtain imaging for the refuge using the light detection and ranging (LIDAR) technology.
- Until the sagebrush shrubland habitat is defined, fully suppress wildfires in this habitat.
- Conduct prescribed burns only after the current characteristics of sagebrush shrublands are defined.
- Limit off-road vehicle use.
- Do not expand feedgrounds into sagebrush shrubland communities on the northern end of the refuge.

Rationale

Mapping of plant community types conducted between 2007 and 2009 identified 8,990 acres of sagebrush-associated plant communities on the refuge, but height and density of sagebrush within these areas has not been quantified at a fine scale. These communities on the refuge provide important habitat for the Jackson Hole greater sage-grouse population, and identifying and, when appropriate, protecting greater sage-grouse habitat is the highest priority for sagebrush-associated plant communities.

Sagebrush Shrublands Objective 2

Within 10 years, manage an estimated 1,000–3,000 acres of sagebrush shrubland communities to promote desired habitat conditions of sagebrush at least 11 inches tall with more than 15-percent canopy cover to assure no net loss of these sagebrush areas.

Strategies

- Manage sagebrush shrublands to prevent degradation, maintain native structural and compositional characteristics, and allow degraded areas to recover, especially areas used by greater sage-grouse and other sagebrush-dependent species.
- Use wildland fire to help accomplish the objective and reduce hazardous fuel.
- Minimize off-road vehicle use.
- Limit elk feeding to current areas.
- Conduct habitat treatments in greater sage-grouse core areas in accordance with Wyoming Executive Order 2011–5.

Rationale

Holloran and Anderson (2004) suggested greater sage-grouse wintering habitat was the principal limiting factor on the Jackson Hole greater sage-grouse population and recommended protecting mature sagebrush stands from disturbance. The Upper Snake River Basin Sage-Grouse Conservation Plan (WGFD 2008) recommended maintaining and protecting tall sagebrush (11- to 31-inch-high stands with more than 15-percent canopy cover) as forage sites for wintering greater sage-grouse. Because the refuge needs a detailed inventory of the sagebrush shrubland plant community structure, 1,000–3,000 acres is an imprecise estimate of the acreage that we would need to manage or provide special protection to meet management objectives. A more exact acreage will be determined through Sagebrush Shrublands Objective 1.

Wetlands Objective 1

Within 5 years, replace water control structures for the three existing Romney Ponds and Bill's Bayou, and over the life of the plan construct two new ponds in the Romney Pond complex.

Strategies

- Develop funding partnerships with WGFD and nonprofit organizations.
- Evaluate the current and replacement water control structures for fish passage and screening.
- Replace existing water control structures with inline water control structures with beaver-proof screens.
- Construct two new ponds to the north of the existing Romney Ponds and use inline water control structures and beaver-proof screens.

Rationale

The ability to manipulate water levels is necessary to meet habitat management objectives for trumpeter swans, but water control structures in the Romney Pond complex and Bill's Bayou are near the end of their operational life and vulnerable to beaver damage. The Gros Ventre River channel is shifting to the south and eroding the Pierre's Pond dikes; maintaining these ponds is no longer practical. Unlike the Pierre's Pond complex, the Romney Pond complex is not vulnerable to river damage. Construction of two new ponds in the Romney Pond complex would replace the swan habitat lost when Pierre's Ponds fail.

Wetlands Objective 2

Within 10 years, maintain 30–50 percent pondweed cover and 10–20 percent emergent vegetation in artificial ponds that have water management capability.

Strategies

- Gradually reduce water levels in spring and maintain low water levels until the following spring on a 4- to 7-year rotating schedule for each pond to increase pondweed cover.
- Use wildland fire to help accomplish the objective and reduce hazardous fuel.

Rationale

Water management would develop nesting and brood-rearing habitat for trumpeter swans. Squires and Anderson (1995) suggested that pondweed tubers ranked among the highest in nutritional quality for trumpeter swans, and water level manipulations have been shown to promote sago pondweed (Kantrud 1990). Some emergent vegetation is preferred for swan breeding sites (Lockman et al. 1987).

Wetlands Objective 3

Within 5 years, inventory and map invasive plant species in the Flat Creek wetland complex, and for the life of the plan limit cover of listed noxious weeds to less than 1 percent of the Flat Creek wetland complex.

Strategies

- Use high-resolution photography at peak flowering periods to search for large infestations of perennial pepperweed and purple loosestrife in inaccessible locations.
- Inventory invasive plant species in the Flat Creek wetland complex using watercraft.
- Pull, bag, and remove invasive plants if found.
- Use appropriately labeled herbicide where applicable.

Rationale

Early detection of invasive plants is critical to the effective control of infestations (Dewey and Andersen 2004).

Riparian Woodlands and Aspen Woodlands Objective 1

Within 5 years, identify and map sites within the lower Flat Creek riparian zone with the highest potential for willow restoration. Over life of the plan, restore 200 acres of willow communities in the lower Flat Creek riparian zone to class 1 or class 2 conditions (refer to page 49 of the Bison and Elk Management Plan for definitions).

Strategies

- Map areas with existing willow along fish-bearing stream channels in Flat Creek.
- Install exclosures around high-priority mapped areas.
- Remove fences to exclude elk and bison around mapped areas after recovery. Rotate fences to restore new areas.

Rationale

Willow restoration would support fish habitat and habitat for birds. The Bison and Elk Management Plan indicates that 800 acres of willow habitat will be restored to class 1 or class 2 condition using 500- to 1,000-acre exclosures, but the refuge has not begun any significant efforts to achieve this objective to date. Results from experimental exclosures (Smith et al. 2004, refuge unpublished data) suggest that, even with the complete exclusion of elk and bison, it will take at least 10 years for class 4 willow communities to recover to class 1 condition. Given these limitations, we need to limit restoration to areas with the greatest potential for restoration (existing class 4 willow patches along fish-bearing stream channels).

Riparian Woodlands and Aspen Woodlands Objective 2

Over the life of the plan, restore 100 acres of the riparian, narrowleaf cottonwood community to class 1 or class 2 condition in the upper Flat Creek riparian zone (refer to page 49 of the Bison and Elk Management Plan for definitions).

Strategies

- Use separate exclosures to allow movement of elk and bison between the McBride and Chambers management units.
- Consider using prescribed fire to stimulate regeneration in areas where exclosures are in place.
- Install exclosures around high-priority mapped areas.
- Remove fences used to exclude elk and bison after vegetation recovery.

Rationale

Elk and bison browsing has modified the cottonwood plant community in the upper Flat Creek riparian zone to class 3 and class 4 conditions (Smith et al. 2004). Even if elk and bison population objectives were met, the refuge would need to completely exclude elk and bison from these areas to recover to class 1 or class 2 condition.

Riparian Woodlands and Aspen Woodlands Objective 3

Within 10 years, inventory the class condition (refer to page 49 of the Bison and Elk Management Plan for definitions) of willow, cottonwood, and aspen stands in the Gros Ventre River riparian area and Gros Ventre Hills. For the life of the plan, maintain the existing acreage of class 1 and class 2 condition willows, cottonwood, and aspen.

Strategies

- Inventory existing structural characteristics using remote sensing (LIDAR) combined with field ground-truthing.
- Limit elk and bison browsing pressure in class 1 and class 2 willow, cottonwood, and aspen by limiting prescribed burning next to these stands, maintaining high hunting pressure on the northern end of the refuge, hazing elk and bison off the refuge during summer, using exclosure fences, and encouraging wolf activity on the northern end of the refuge.
- Consider using prescribed fire to stimulate regeneration in areas where exclosures are in place.

Rationale

The refuge would need a comprehensive class condition inventory to figure out where and when restoration efforts should occur. Objectives in the Bison and Elk Management Plan call for restoration of 800 acres of willow, 1,000 acres of cottonwood, and 1,000 acres of aspen to class 1 or class 2 condition, with the greatest opportunity for cottonwood and aspen restoration on the northern end of the refuge. Although the analysis for the Bison and Elk Management Plan predicted that large-scale exclosures would be neces-

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Scarlet Paintbrush

sary to restore aspen in the Gros Ventre Hills, new data for this area suggests limited recovery of aspen has occurred without exclosures since 2005 (Keigley et al. 2009).

Flat Creek Enhancement Objective 1

From 2014 to 2016, carry out the cooperative Flat Creek enhancement project by treating approximately 1.2 miles of Flat Creek each year.

Strategies

- Assess existing structures, tree revetments (streambank support), and other treatments for functionality and habitat values.
- Remove, rehabilitate, or replace previously installed treatments with more suitable treatments, including removal of deteriorating instream structures, riprap, and an old, broken walkway.
- Specify appropriate stream habitat structures based on lessons learned from failed structures.
- Enhance riffle and pool habitats to increase spawning, rearing, and juvenile habitats for native Snake River cutthroat trout.
- Modify meanders.
- Stabilize severe streambank erosion where it jeopardizes project success.
- Provide for continued irrigation and diversion activities such that habitat enhancement and channel restoration activities are not jeopardized.
- Map, remove, treat, and control infestations of reed canarygrass along both sides of Flat Creek.
- Install woody and sod vegetation.
- Schedule construction during September to November to avoid cutthroat trout spawning, Flat Creek opening to anglers, elk and bison hunting and feeding periods, and the winter range restriction period.
- Continue to cooperate with WGFD and allow ample access to the refuge for fisheries management activities.

Rationale

Instream treatments along with riparian area restoration are necessary to restore stream form and function to Flat Creek, which would provide increased hydrologic stability as well as more habitat for all stages of the native Snake River cutthroat trout. WGFD, as the lead for the Flat Creek enhancement project, and the refuge have support for this project from several partners: Rocky Mountain Elk Foundation, Teton County Conservation District Board, and Trout Unlimited.

Flat Creek Enhancement Objective 2

In 2015, after the initial enhancement work in Flat Creek (objective 1) is done, monitor the treatments for effectiveness and to make any needed adjustments.

Strategies

- Assess the stability and functionality of structures.
- Assess the bioengineering treatment (live material used in engineered treatments) establishment, such as willows used in bank stabilization.
- Assess the disturbed area reclamation and revegetation.
- Assess the achievement of overall project goals (described in chapter 3, "3.8 Alternative D" under "Flat Creek Enhancement" in the habitat section).

Rationale

Based on the results of monitoring, we can apply adaptive management strategies to adjust the treatments, as needed, to increase the ecological benefits and better achieve the goals and objectives for the Flat Creek enhancement project. Monitoring can provide case study information, educational materials, and learning opportunities that we can use to make sure that future projects are carried out as effectively and efficiently as possible.

Flat Creek Enhancement Objective 3

Within 10 years, fully restore at least 1 mile of lower Flat Creek to improve fish habitat, support productive native trout populations, and promote natural and stable river morphology characteristics.

Strategies

- Support and carry out the Flat Creek enhancement project as described in objectives 1 and 2.
- Continue to cooperate with WGFD and allow ample access to the refuge for fisheries management activities.

Rationale

Part of the habitat and wildlife goal is to restore and sustain a native fishery that supports quality fishing opportunities. Restoration of this portion of Flat Creek to promote natural and stable river morphology characteristics will enhance cutthroat trout habitat, potentially increase cutthroat trout populations, and provide quality fishing opportunities for native trout.

Invasive Species Objective 1

Throughout the life of the plan, treat more acreage as needed to ensure that the total of all noxious weed and other invasive plant infestations does not exceed the current 1,100 acres.

Strategies

- Control invasive plants using integrated pest management including biological, cultural, mechanical, and chemical methods.
- Prevent new infestations of invasive plants including noxious weeds, nonnative grasses, and aquatic invasive species by preventing the artificial transportation of seeds and materials onto the refuge through efforts like public education, weed-free-hay rules, and the cleaning of all excavation and angling equipment before entering the refuge.
- Increase monitoring and rapid response for new infestations including invasive species of aquatic plants and animals.
- Identify and consider removing invasive plants that are not considered noxious weeds, but are nonnative plant species such as crested wheatgrass, reed canarygrass, meadow foxtail, yellow sweetclover and cheatgrass.

Rationale

The National Elk Refuge has 1,100 acres of invasive plants, including noxious weeds, and no known occurrence of invasive animals or aquatic invasive species at this time. Noxious weed species threatening establishment and of greatest concern are Dalmatian toadflax, perennial pepperweed, and whitetop. Other weed species present and of concern include yellow toadflax; spotted, diffuse and Russian knapweed; sulfur cinquefoil; Dyer's woad; oxeye daisy; plumeless thistle; black henbane; houndstongue; and common burdock. Weed species such as Canada and musk thistle are well established and of lower prior-

ity but still require control to prevent dense stands that negatively affect native vegetation and wildlife forage.

Invasive Species Objective 2

Over the life of the plan, reduce the existing 420-acre spotted knapweed infestation along the Gros Ventre River corridor by 50 percent.

Strategies

- Develop large-scale invasive plant eradication programs (greater than 100 acres of infestation) where possible.
- Identify and develop suitable funding sources for monitoring, treatment, restoration, and public information.
- Use existing partnerships and private contractors.
- Focus efforts on proven methods with using effective herbicides and applicable mixes and insects.

Rationale

Spotted knapweed is localized, infests 420 acres within the National Elk Refuge, and is mostly contained within the Gros Ventre River corridor and adjacent lands. The spotted knapweed population on the refuge represents a major risk for new infestations in other parts of the Greater Yellowstone Ecosystem. Within the refuge boundary, migration of spotted knapweed from the river corridor into the adjacent uplands would have a significant effect on existing greater sage-grouse populations and their habitat. Infestations would substantially degrade the vital, large ungulate, winter habitat and reduce the refuge's winter population carrying capacity.

Data from elk radio collars and GPS collars suggest that 90 percent of elk migration routes from the refuge transect the Gros Ventre River corridor (Cole and Ketchum 2011, Smith and Robbins 1994). There is considerable evidence that wild and domestic ungulates facilitate the transport of invasive plant species seeds (Schiffmam 1997) and might be responsible for colonization of invasive plant species into new areas (Boulanger et al. 2011). Seed ingestion and viability in feces has been documented in various studies (Malo et al. 2000, Olson et al. 1997), and seed transport in the coats of wild and domestic ungulates is also substantiated (Constible et al. 2005, De Clerke-Floate 1997). Because elk that winter on the refuge migrate as far as Yellowstone Lake, the risk of seed transport by elk and colonization of spotted knapweed in uninfested parts of the Greater Yellowstone Ecosystem is significant. A major reduction in spotted knapweed density in the Gros Ventre River corridor would reduce the threat of new infestations in Grand Teton National Park, Teton Wilderness, and the southern part of Yellowstone National Park.

Migratory Birds Objective

Within 5 years, institute a monitoring program for migratory birds to evaluate the effects of habitat management activities on trumpeter swan, long-billed curlew, and other migratory bird species potentially affected by refuge habitat management activities.

Strategies

- Conduct post-treatment migratory bird surveys in K-line experimental areas and compare to 2010 pretreatment data as defined by Dieni (2011).
- Continue monitoring trumpeter swans during nesting season to determine the number of breeding pairs, number of active and successful nests, number of cygnets hatched per nest, and number of cygnets fledged per nest.
- Continue monitoring long-billed curlews at a level sufficient to identify nesting territories and to avoid irrigating these areas until after birds have fledged.
- Conduct baseline surveys of breeding birds in areas subject to habitat management.

Rationale

Trumpeter swans and long-billed curlews are sensitive migratory species potentially affected by refuge management activities. Their small population sizes and relatively large breeding territories warrant species-specific monitoring. Large-scale habitat modifications are ongoing or planned in irrigated grasslands; sagebrush grasslands; and willow, aspen, and cottonwood plant communities. Baseline surveys of breeding birds in proposed treatment areas would allow managers to evaluate the effects treatments on

bird communities and adaptively adjust treatments if necessary.

Aquatic Species Objective

Within the life of the plan, decrease nonnative trout prevalence in Flat Creek by 25 percent.

Strategies

- Continue to cooperate with WGFD and allow ample access to the refuge for fisheries management activities.
- Remove all nonnative trout captured during fish surveys.
- Aggressively target brook trout for removal from Flat Creek during the fall spawning period using electrofishing and trapping techniques.
- Continue angler education efforts about the effect of nonnative species on the native fishery and encourage angler harvest of nonnative trout.

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Wolf

- Design and install a fish passage screen at the Southpark diversion to prevent nonnative trout in the Gros Ventre River from entering Flat Creek.
- Support and carry out habitat restoration of Flat Creek as described in the restoration plan (Biota 2013a) on file at the refuge.

Rationale

Nonnative trout populations can be substantially reduced by direct removal, preventing their introduction into irrigation systems, and by improving stream habitat conditions that provide a competitive advantage to native trout populations.

Disease Management Objective 1

Within 5 years, develop a comprehensive disease contingency plan in coordination with WGFD and Grand Teton National Park.

Strategies

- Identify current and potential wildlife diseases.
- Develop response plans for disease outbreaks.

Rationale

Wildlife populations and associated pathogens do not recognize land management boundaries or agency jurisdictions. Developing interagency response plans to disease outbreaks before occurrence increases the likelihood of mitigating negative effects (Mörner et al. 2002).

Disease Management Objective 2

Within 5 years, quantify baseline patterns of elk group size, distribution, and density for elk on the refuge.

Strategy

- Use high-resolution, photograph-based mapping to count elk groups on the refuge.

Rationale

There is considerable evidence that high animal density adds to disease risk (Gross and Miller 2001, Maichak et al. 2009), but there is no fine-scale data to evaluate current elk density conditions on the refuge. Quantifying elk density patterns would facilitate modeling to predict the potential effects of disease outbreaks and allow the refuge to adaptively manage elk density compared to baseline conditions (Gortazar et al. 2006).

Disease Management Objective 3

Retest fish for whirling disease in next 5 years.

Strategy

- Conduct whirling disease sampling during electroshocking operations conducted by WGFD.

Rationale

During routine monitoring in 2003, sampled sent to the WGFD laboratory tested positive for Myxololus cerebralis, the parasite that causes whirling disease. Infection levels were low and no population-level declines have been documented. No further testing has been done since 2003.

Federally and State-Listed Species Objective 1

Within 5 years, develop an inventory and monitoring plan for all federally listed threatened, endangered, and candidate species and State species of concern that potentially exist on the refuge.

Strategies

- Create a list of potential Federal threatened and endangered species and State species of concern that exist on the refuge.
- Document existing and historical records of occurrence and survey data for relevant species.
- For species with sufficient available data, document the species' status and trend.
- For species with insufficient data, develop monitoring plans to supply information needs.
- Follow and carry out Wyoming Executive Order 2011–5 for the greater sage-grouse.

Rationale

Habitat manipulations are proposed in many refuge plant communities, but the status and trend of Federal threatened and endangered species and State species of concern are unknown. Adequate baseline population information for these species would make sure that refuge actions could be adaptively managed to prevent negative effects on these populations.

Federally and State-Listed Species Objective 2

Within 1 year, develop a protocol to salvage, hatch, and return trumpeter swan cygnets to nests threatened by flooding in the Flat Creek Marsh.

Strategy

- Cooperate with WGFD and the Wyoming Wetland Society to develop and implement the swan egg salvage protocol and to install floating nest structures near breeding territories most at risk to flooding.

Rationale

Past monitoring suggests that water diverted from the Gros Ventre River combined with spring runoff causes flooding that destroys swan nests in the Flat Creek Marsh. Egg salvage and installation of floating nest platforms would mitigate this effect and improve nest success and cygnet survival.

Research and Monitoring Objective

Within 5 years, develop a comprehensive inventory and monitoring plan designed to evaluate habi-

tat management objectives, migratory bird populations, Federal threatened and endangered species, State species of concern, and Bison and Elk Management Plan objectives.

Strategies

- Rank information needs and identify areas where insufficient information exists.
- Develop study designs to answer questions of interest.
- Work with cooperating agencies, nongovernmental organizations, and volunteers to pay for inventory and monitoring projects and help with fieldwork.
- (Also refer to strategies for species of concern, migratory birds, and disease management.)

Rationale

The inventory and monitoring plan would help set priorities for research and monitoring tasks to make sure that critical information is being collected to guide management decisions.

Preserve and interpret cultural resources in a way that allows visitors to connect to the area's rich history and conservation heritage.

Cultural Resources Objective

Protect and preserve cultural resources on the refuge through coordination with the Region 6 cultural resources branch, which helps refuge staff in meeting the requirements of section 106 of the National Historic Preservation Act and other cultural resources–related legislation.

Strategies

- Inform the Region 6 cultural resources staff of refuge projects early in planning by using the Cultural Resources Review Form.
- Develop exhibits and signage to enhance educational opportunities.
- Encourage collaboration with interested tribes in developing relevant materials and correct interpretation of cultural resources.
- Identify facility needs for interpretive programs and assessment for any rehabilitation work done on the historic Miller Barn.

Rationale

It is important to protect the integrity of known cultural resources and make sure our activities do not affect unknown resources. Accurate information would help the refuge develop effective educational and interpretive materials for the public that would explain and encourage preservation of cultural resources.

6.7 Visitor Services Goal

Enable a diverse audience to understand and appreciate the refuge's wildlife conservation role in Jackson Hole, while safely enjoying year-round opportunities for wildlife-dependent recreation.

Visitor services are concentrated on the southern end of the refuge where most of the public use occurs because of the adjacency to the town of Jackson. Figure 12 shows this area, including several of the proposed uses. In addition, figures 13 and 14 reflect access and hunt areas during the elk hunting and bison hunting seasons, respectively.

Hunting Objective 1

Within 10 years, develop a hunting program for young people that provides quality hunting opportunities.

Strategies

- Cooperate with WGFD to develop hunting season proposals.
- Work with the Boy Scouts of America and other outdoor-focused youth groups to identify important traits for a youth hunt.

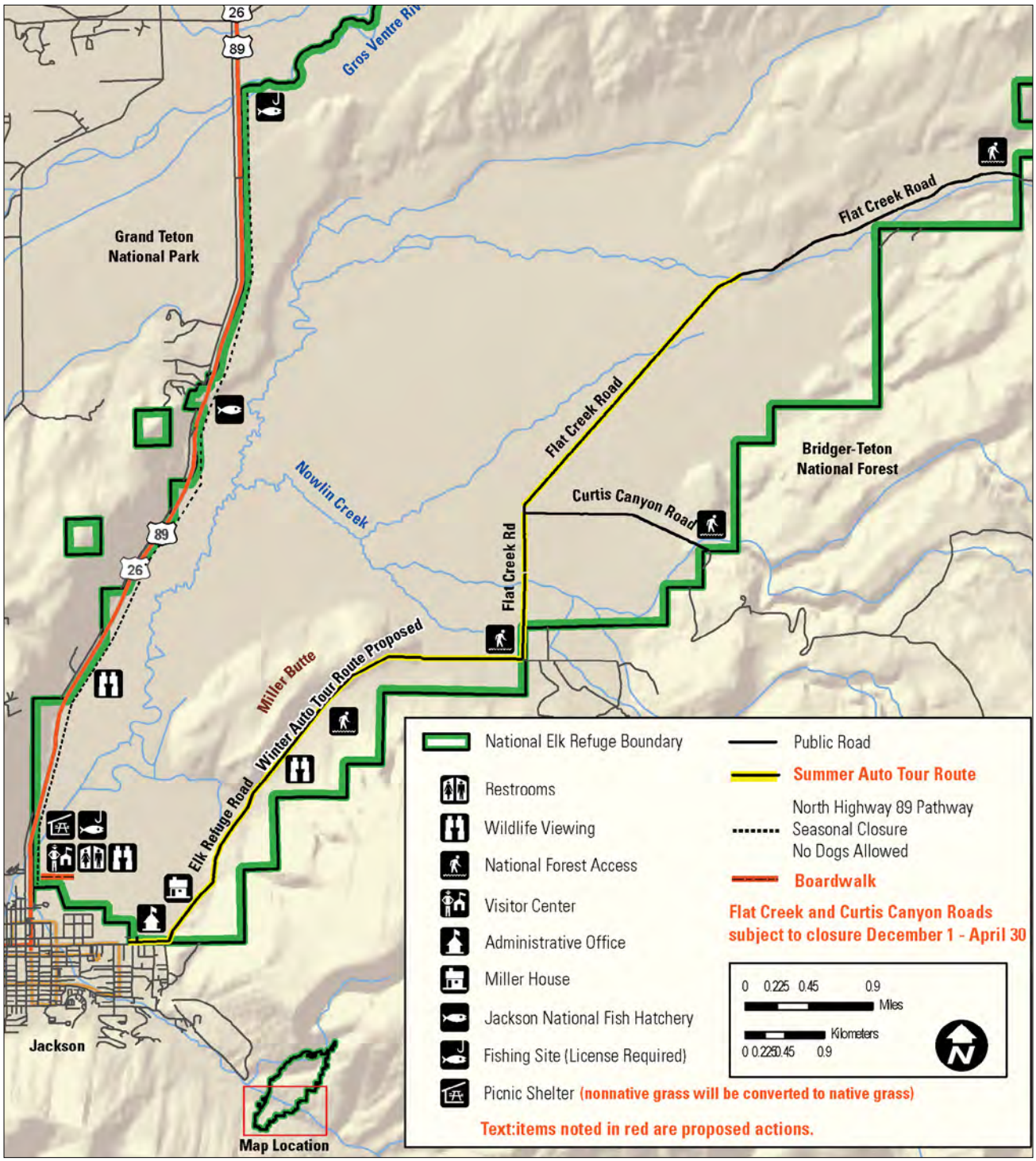

Figure 12. Map of visitor services on the southern end of the National Elk Refuge, Wyoming.

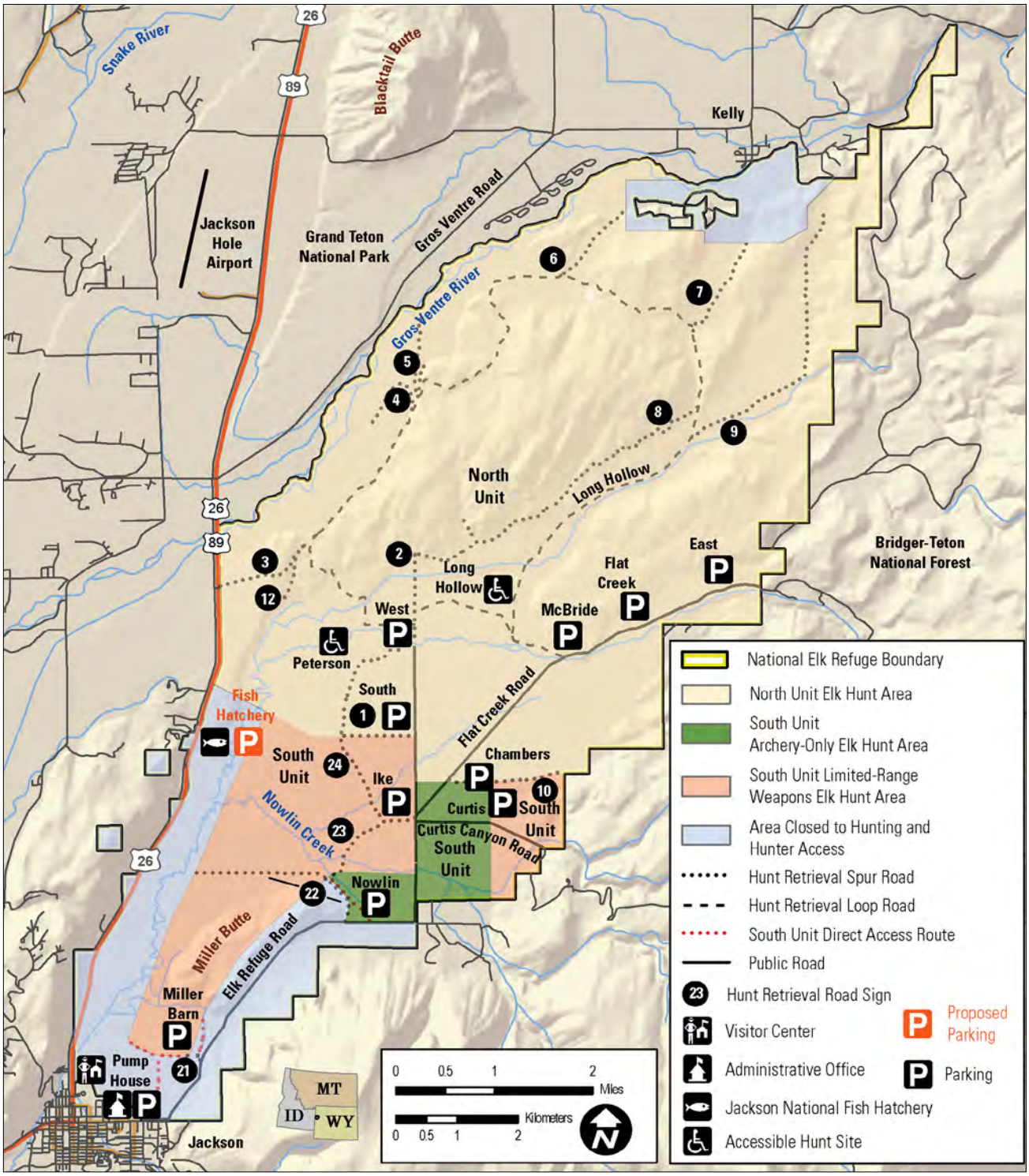

Figure 13. Map of the elk hunting program on the National Elk Refuge, Wyoming.

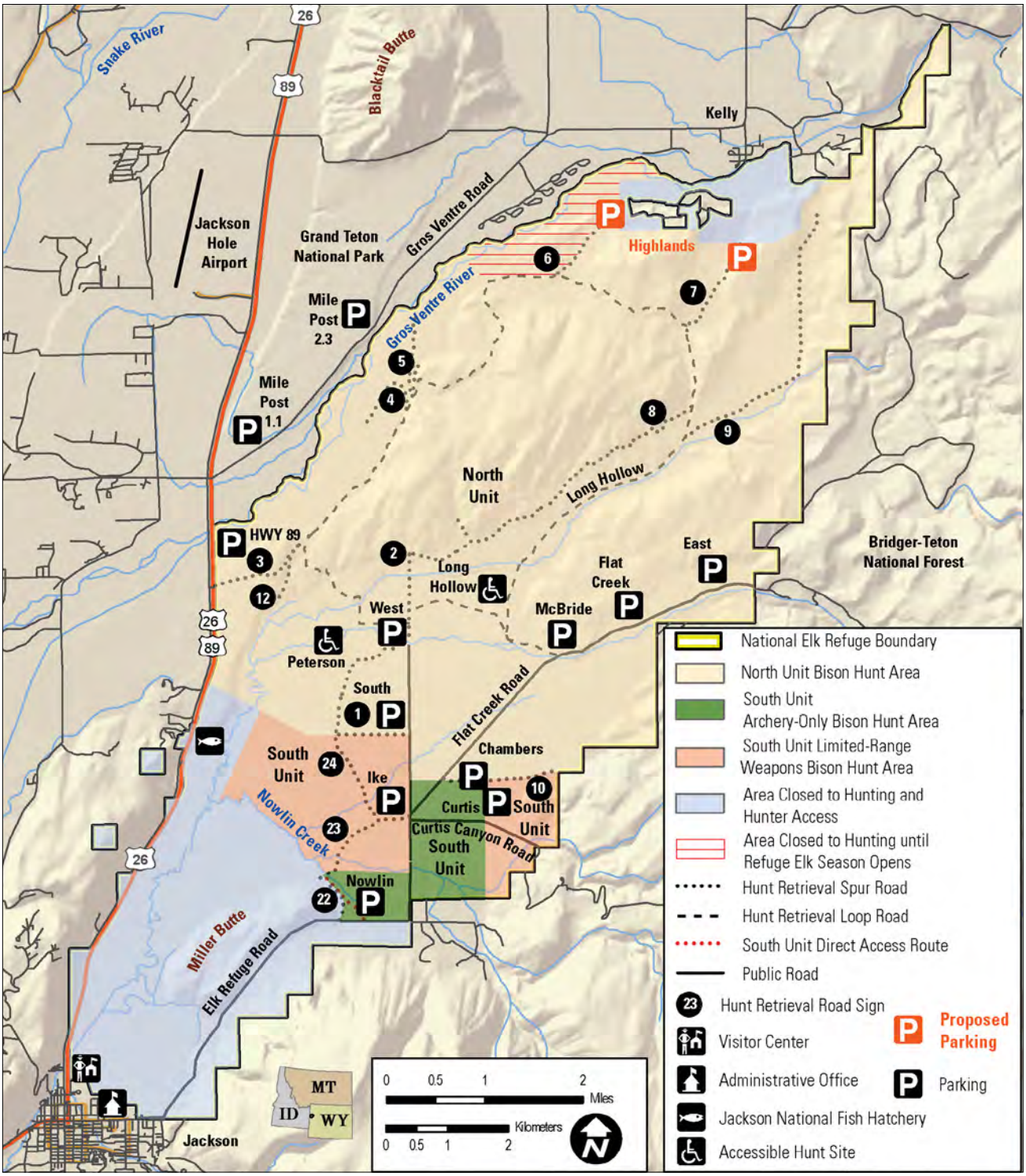

Figure 14. Map of the bison hunting program on the National Elk Refuge, Wyoming.

- Move the existing youth hunt to a time later in the hunting season when there are likely large elk numbers present on the refuge.

Rationale

Recruiting young hunters into the hunting culture is critical for continued public support of hunting as an accepted wildlife-dependent recreational activity, continued use as a wildlife management tool, and as the primary funding source for modern wildlife management. Key elements of any hunt for young people are preventing competition for game from adult hunters, adult supervision and mentoring, and quality opportunities to see and interact with wildlife.

Hunting Objective 2

Within 5 years, develop regulations for proper storage of bear attractants and for bear-deterrent practices on the refuge that address hunters and hunting practices.

Strategies

- Develop regulations that focus on reducing attractants to parking areas and vehicles.
- Provide guidelines for refuge staff when a bear is present on the refuge.
- Provide educational material and guidelines to hunters on bear behavior and what to do in the presence of a bear, including carrying and using bear spray.

Rationale

A significant population of grizzly bear lives at Grand Teton National Park and Bridger-Teton National Forest. The bears are habituated to hunter-killed elk and bison and gut piles, and these food sources are an important part of their fall diet. The refuge hunting program produces large quantities of both carcass remains and gut piles throughout the refuge. Grizzly bears have discovered this food source and were present on the refuge after the bison hunt began in August 2013.

Hunting Objective 3

Within 10 years, develop a hunting opportunity for trophy bull elk on the refuge.

Strategies

- Work cooperatively with WGFD to develop a bull elk license specifically for the refuge.
- Develop an antler point restriction to make sure only mature bulls are harvested.
- Provide educational and outreach material to other refuge users and the public to educate them about the Refuge System's mandate to provide recreational hunting opportunities when they are compatible with the purpose of the refuge.

Rationale

Congress has identified hunting as a priority wildlife-dependent use for the Refuge System. The National Elk Refuge uses hunting as an important wildlife management tool. Other opportunities such as a limited-quota bull hunt could be made available to hunters as long as these opportunities supported the purpose of the refuge. A limited-quota bull hunt would increase hunting interest in the refuge, attract more hunters to participate in the annual cow hunt, and introduce more hunters to the purpose and vision of the National Elk Refuge.

Hunting Objective 4

Within 10 years, develop hunter-use management tools to better manage hunt program opportunities.

Strategies

- Work cooperatively with WGFD to develop hunter checkpoints and hunter success surveys.
- Consider requiring mandatory reporting of tag use and harvest.

Rationale

Our current tools provide only minimum estimates of harvest and do not provide any data about hunter success or tag use on the refuge. More complete hunter use data would allow refuge staff to better manage refuge hunting opportunities and optimize refuge hunter use, distribution, and harvest management.

Hunting Objective 5

Within 5 years, develop and implement guidelines for a commercial guided hunting and retrieval.

Strategies

- Coordinate with WGFD.
- Set limits for the number of permits issued each season for guided hunting.
- Set limits for the number of trips, guides, and clients per day per company.
- Establish a permit fee for commercial hunting guides.

Rationale

Guided hunting and retrieval could increase hunter success and help meet population objectives for bison and elk.

Fishing Objective 1

Within 5 years, develop and implement guidelines for a commercial guided fishing program, with special attention to the lower Flat Creek area.

Strategies

- Coordinate with WGFD to conduct an angler survey.
- Set limits for the number of permits issued each season for guided fishing.
- Set limits for the number of trips, guides, and clients per day per company.
- Establish a permit fee for commercial fishing guides.
- Provide accessible opportunities for fishing.

Rationale

Unlimited commercial guiding has degraded the fishing experience for unguided individuals fishing on lower Flat Creek. Controls placed on the total number of guides permitted to work the refuge, as well as the total number of clients they are allowed to guide on each trip, would remove much of the congestion caused by large guided groups and improve the quality of experience had by all anglers on Flat Creek. Permit fees collected from commercial guides would help to pay for law enforcement activities and education and outreach materials.

Fishing Objective 2

Within 5 years, increase education of commercial guides and anglers on the negative effects of nonnative fish on the native Snake River cutthroat trout fishery and encourage angler harvest of nonnative trout.

Strategies

- Work cooperatively with WGFD and Trout Unlimited to develop support for this program.
- Through increased education of commercial guides and anglers, increase angler harvest of nonnative trout.

Rationale

Fish harvest systems have a powerful effect on fish populations. By encouraging guided anglers to remove all nonnative trout they catch, many more would be removed than by employing management activities alone. The refuge would focus on guided anglers because they generally have better fish identification skills than the average angler.

Fishing Objective 3

Continue angler education about the negative effects of nonnative fish on the native Snake River cutthroat trout fishery and encourage angle harvest of nonnative trout.

Strategies

- Work cooperatively with WGFD and Trout Unlimited to develop support for this program.
- Use public outreach to improve identification of fish species.

- Update fishing regulations and refuge brochures.

Rationale

Fish harvest systems have a powerful effect on fish populations. By encouraging anglers to remove all nonnative trout they catch, many more would be removed than by employing management activities alone. The 10-year timeframe would give us ample time to develop outreach materials and identification aides.

Wildlife Observation and Photography Objective 1

For the life of the plan, enrich existing wildlife observation and photography opportunities on the refuge (25 percent of people report an enhanced experience).

Strategies

- Maintain access to turnouts, trails, and other observation sites:
  - Second-story, visitor center viewing platform.
  - Bert Raynes Boardwalk and remote-viewing platform near the visitor center.
  - Turnout just north of the visitor center and Flat Creek Bridge.
  - Elk jump turnout along Highway 89 (seasonal summer use only).
- Support a contracted, winter interpretive sleigh ride program.
- Allow wildlife-touring companies to operate on the refuge through a special use permit that outlines special conditions for operation.
- Lead winter wildlife excursions.
- Loan equipment like binoculars, scopes, and backpacks through various Service initiatives and programs to increase opportunities for experiences and observation on the refuge.

Rationale

Visitor surveys conducted by the Jackson Hole Chamber of Commerce have consistently documented that 80–90 percent of valley tourists identify natural resource–based activities as their primary reason for visiting Jackson Hole. Viewing the mountains, bison, elk, birds, and other wildlife was rated as an important activity by local and nonlocal refuge visitors (Loomis and Caughlan 2004). Wildlife viewing and photography are two of the six priority public uses (wildlife-dependent recreational uses) of the Refuge System.

Wildlife Observation and Photography Objective 2

Over the life of the plan, implement at least five new, accessible wildlife observation opportunities on the refuge.

Strategies

- Develop a more prominent access route across the visitor center lawn to the existing remote-viewing platform.
- Develop a boardwalk through already disturbed wetlands near the visitor center.
- Build a photo blind along the boardwalk for noncommercial photography.
- Use webcams on the refuge to provide remote wildlife-viewing opportunities.
- Incorporate accessible opportunities into wildlife observation and photography programs.
- Develop a wildlife checklist.

Rationale

Public use would increase at area-specific, intensive use locations, resulting in increased development in some areas of the refuge. Visitors would have enhanced options to experience the refuge.

Steve Miller / FWS

Environmental education at the refuge occurs at a variety of locations and events.

Environmental Education and Interpretation Objective 1

For the life of the plan, provide a variety of opportunities for environmental education and interpretation.

Strategies

- Maintain and improve diverse and dynamic interpretive displays, new media, and handout literature that continually enhance and increase visitors' interest in exploring the refuge.
- Develop a self-guided, interpretive tour route on Elk Refuge Road.
- Offer improved programs at the Jackson Hole and Greater Yellowstone Visitor Center, Miller House, and offsite areas with more permanent or seasonal interpreters.
- Produce short video segments on a variety of topics related to the Service and share with audiences through multiple venues.
- Use the Miller Barn as an interpretive site once stabilization and restoration work is completed.

Rationale

Environmental education is a process designed to teach citizens and visitors of all ages the history and importance of conservation and scientific knowledge about the Nation's natural resources. Through improved facilities and increased displays and presentations, we could better help to develop awareness, knowledge, attitudes, skills, motivation, and commitment for the public to work cooperatively toward conservation.

Environmental Education and Interpretation Objective 2

For the life of the plan, use the North Highway 89 Pathway to interpret the refuge purposes and mission of the Refuge System.

Strategies

- Use the existing Jackson Hole Community Pathways to interpret wetland values.
- Coordinate with Jackson Hole Community Pathways about pathway traffic flow, develop trailside interpretive signage, and encourage wildlife viewing.

- Cooperate with Jackson Hole Community Pathways to evaluate pathway effects on wildlife and habitat and adjust seasonal use as appropriate.

Rationale

Refuge staff would use the pathway during the open season as an interpretive venue. This would maximize the season and opportunity for interpretation without affecting wildlife.

Visitor Center Objective 1

Within 5 years, secure annual funding from visitor center partners to help with operation expenses, and document the financial assistance in a signed multiyear partnership agreement.

Strategies

- Regularly meet with partners to provide an overview of visitor center visitation and expenses incurred for seasonal operational periods.
- Provide partners with expense reports that detail the annual costs of goods and services needed for critical visitor center operations.
- Use partner contributions as a sustainable way to pay for visitor center operations.
- Monitor information desk questions to document the benefits of the visitor center operation to each agency.
- Keep current a partnership agreement between the organizations and an annual operating plan.

Rationale

The Jackson Hole and Greater Yellowstone Visitor Center is an interagency facility, staffed and supported by area agencies and organizations. Each visitor center partner would continue to gain substantial financial benefit from our staff and visitor services rather than having to staff and provide a visitor contact location of their own. Sharing the financial burden among the agencies of operating the center, including purchasing supplies, would make it equitable for each of the partners.

Visitor Center Objective 2

Within 10 years, rehabilitate the existing building or build a new visitor center to address the aging building's maintenance deficiencies.

Strategies

- Document maintenance issues as they occur.
- Continually evaluate and keep current the building condition assessment through the Service's reporting procedures.
- Prioritize the maintenance needs in our agency maintenance reporting systems.
- Complete evaluations or surveys that would need to be done before new construction.

Rationale

The visitor center building was formerly owned by the Wyoming Department of Transportation and served as a State Information Center for the Wyoming Division of Tourism. The building is more than 50 years old and has many significant maintenance issues such as deficiencies in the electrical system, annual flooding in the crawlspace, rotted wood on the remote-viewing platform, and noncompliance with the Architectural Barriers Act Accessibility Standard (United States Access Board 2013). A rehabilitated or new visitor center would also address the lack of space for interpretive programs or presentations to school or other large groups.

North Park Objective

Within 3 years, manage North Park in accordance with Service policies, restore the park area to native habitat, and develop interpretive services.

Strategies

- Revise the memorandum of understanding with the town of Jackson to do away with the reservation and fee-collection system for the picnic shelter.
- Develop and provide public information about appropriate and compatible uses of the refuge.

- Develop interpretive displays to support and explain the refuge purposes and Refuge System mission.
- Renovate habitat to reduce the lawn and restore native vegetation.

Rationale

The refuge would work toward its goal of limiting public use to appropriate and compatible wildlife-dependent recreational uses as identified our agency policies. The refuge would shift away from fringe uses or those that are prohibited by agency policy.

Other Uses Objective

Throughout the life of the plan, provide proper and compatible opportunities for wildlife-dependent recreation and non-wildlife-dependent recreation that support the six priority public uses or contribute to public appreciation of the refuge.

Strategies

- Allow the following compatible and proper uses as long as wildlife is not disturbed and when areas are not closed for safety reasons:
  - access to the Bridger-Teton National Forest
  - North Park at the visitor center
- Allow under special use permit the following compatible and proper uses as long as wildlife is not disturbed:
  - commercial photography
  - commercial tours for wildlife viewing
  - commercial guiding and game retrieval for hunting
  - commercial guiding for fishing
  - ceremonial tribal bison hunt
- Prohibit the following incompatible uses:
  - general collection of shed antlers
  - collection of berries, fruit, roots, wildflowers, and mushrooms
  - collection of reptiles and amphibians
  - weddings
  - boating
  - swimming
- Phase out commercial horseback trail rides.
- Review requests for other non-wildlife-dependent activities for compatibility and appropriateness case-by-case.

Rationale

The Improvement Act states that other uses can occur within the Refuge System, but they must support or not conflict with a priority public use. Furthermore, a use might not keep a refuge from accomplishing its purposes or the mission of the Refuge System.

Special Use Permit Objective 1

Within 5 years, identify an appropriate level of commercial operations on the refuge. Within 10 years, manage commercial operations to achieve appropriate levels of use for guided fishing, guided hunting, and wildlife-viewing companies.

Strategies

- Monitor ongoing commercial uses.
- Limit special use permits for commercial operations (such as hunting, fishing, and wildlife-viewing tours) to reduce traffic and effects on the refuge.
- Charge fees for commercial companies (guided hunting and fishing, hunting retrieval services, operation of commercial wildlife-viewing tours, and professional photography and videography) to offset administrative costs.
- Include special conditions with each permit to reduce effects on resources and other activities.

FWS

Ciliate Bluebells

- Evaluate and potentially prohibit requests for special access that could be precedent-setting and would demand excessive refuge resources.

Rationale

We recognize that an appropriate level of commercial services can enhance visitor experience by providing programs that the refuge does not have the ability (resources) to provide. There would be no fee required when a special use is related to habitat improvement or wildlife research. If a special use permit resulted in a company profiting from the refuge, a fee to offset administrative costs would be justified. Charging a fee would help offset the costs of the administrative time involved in processing special use permits and compiling annual use information.

Special Use Permit Objective 2

Within 5 years, complete a special use permitting system that has a fee schedule for the processing of permits and the associated costs for accommodating commercial filming or photography activity.

Strategies

- Work with the regional office to implement national guidance on a fee schedule for collecting fees associated with commercial photography and filming.

- Communicate with the Grand Teton National Park permits office to make sure there is not a large discrepancy in the amount of fees charged on the refuge versus those same activities in the neighboring national park.

Rationale

The National Elk Refuge accommodates a large number of commercial photographers and film companies each year, especially during the winter months. Responding to media requests has become an increasing part of the winter duties for the visitor services staff. Making contacts with the permittee, evaluating the request, writing special conditions, completing the permit, and accommodating the request takes refuge staff a substantial amount of administrative time. A fee system would allow the refuge to recuperate some of the administrative costs associated with the activity.

Public Outreach Objective

For the life of the plan, disseminate information about elk and bison management, refuge management practices, and visitor services programs to increase awareness of the National Elk Refuge.

Strategies

- Maintain email contact lists for distribution of refuge information to elected officials, Federal and State partners, nonprofit conservation and partner organizations, key community and business leaders, and regional and national Service contacts.
- Prepare and send out news releases via established email lists.
- Prepare and send out articles via established email lists.
- Use electronic media, including maintaining and keeping current the refuge Web site as well as using our agency's new media and photo-sharing sites.
- Conduct media interviews and accommodate film crews for local, national, and international audiences as workload allows.
- Use refuge leaders in an ambassadorial and leadership role in the community, including extensive involvement in a variety of partnerships.
- Coordinate with the Bridger-Teton National Forest on a winter closure to the public beyond the Twin Creek subdivision.

Rationale

Outreach is critical because of the National Elk Refuge's high profile location, its "flagship refuge" status, and the complexity and controversial nature of many of the management issues. Effective outreach—by giving the media a source of readily available resources and material—would streamline our response to the demand for information from local, regional, national, and international media and decrease the inaccuracy of stories compiled by others.

6.8 Visitor and Employee Safety and Resource Protection Goal

Provide for the safety, security, and protection of visitors, employees, natural and cultural resources, and facilities throughout the refuge.

Visitor and Employee Safety Objective 1

Over the life of the plan, eliminate lost-time worksite accidents and reduce all other accidents by 75 percent.

Strategies

- Continue to talk about safety procedures with employees and volunteers.
- Continue to develop job hazard analyses for new activities.

Rationale

Visitor and employee safety is the refuge's highest priority. We are required to provide a safe and hazard-mitigated environment for all refuge users and our employees.

Visitor and Employee Safety Objective 2

Within 5 years, document road hazards and vehicle accidents.

Strategy

- Monitor and report accidents.

Rationale

Visitor and employee safety is the refuge's highest priority. We are required to provide a safe and hazard-mitigated environment for all refuge users and our employees.

Visitor and Employee Safety Objective 3

Within 10 years, reduce road accidents in identified risk areas by 50 percent.

Strategies

- Enforce no stopping and no parking in the roadway.
- Improve signage.
- Incorporate safety conditions in all special use permits.
- Revoke special use permits when violations occur, and restrict or limit the ability of revoked permittees to obtain future special use permits.

Rationale

Visitor and employee safety is the refuge's highest priority. We are required to provide a safe and hazard-mitigated environment for all refuge users and our employees.

Visitor and Employee Safety Objective 4

Within 5 years, document hunting accidents, violations, and unsafe practices. Over the life of the plan, reduce hunting accidents, violations, and unsafe practices in risk areas and activities by 50 percent.

Strategies

- Revise hunt area boundaries.
- Incorporate safety conditions in hunting publications.
- Increase signage.
- Notify hunters of other public users that might be using the area (such as birders, cyclists, and users of the auto tour route).
- Increase the law enforcement presence during hunting season.
- Revoke hunting permits when safety violations occur, and restrict or limit the ability of hunters with revoked permits to obtain future hunting permits.

Rationale

Visitor and employee safety is the refuge's highest priority. We are required to provide a safe and hazard-mitigated environment for all refuge users and our employees.

Resource Protection Objective 1

Protect wildlife and other natural and cultural resources from damage, theft, or illegal taking to preserve resources for the public and to prevent their unnatural decline.

Strategies

- Enforce hunting, fishing, and other regulations in accordance with the CFR, State laws, and refuge-specific regulations to protect habitat and wildlife.
- Close areas to protect wildlife from human disturbance when necessary.
- Use law enforcement and education to protect cultural resources in accordance with Federal, State, and tribal laws, policies, and guidelines.
- Keep a minimum of two dual-function law enforcement officers or one dual-function and one full-time, permanent law enforcement officer.
- Provide ample and easy access to refuge regulations through various media such as printed leaflets, the Web site and social media, and six information kiosks located throughout the refuge.

Rationale

Adequately staffing refuges with sufficient officers to protect wildlife and habitat and to make refuges safe places for staff and visitors is a top priority for the Refuge System. "Conserving the Future" (FWS 2011), Recommendation 16, charges us to: Conduct a new, independent analysis of refuge law

enforcement to measure progress and to name needed improvements.

Resource Protection Objective 2

Within 5 years, increase law enforcement patrols by 25 percent and develop shift coverage for high-visitor-use seasons.

Strategies

- Detail (temporarily assign) officers from other refuges to the National Elk Refuge.
- Hire a law enforcement officer.
- Obtain a dual-function position.
- Develop special operations for hunting and antler collecting seasons.

Rationale

More law enforcement would be needed to manage the current public use as well as the additional use from increased visitor services programs.

6.9 Administration Goal

Provide facilities and effectively use and develop staff resources, funding partnerships, and volunteer opportunities to maintain the long-term integrity of habitats and wildlife resources of the refuge.

Funding and Staff Objective 1

Over the life of the plan, increase permanent staff by 16.5 FTE positions to help realize the enhancement potential of all refuge programs.

Strategies

- Include more positions in the Refuge Operation Needs System to get future funding.
- Brief our regional leaders about the refuge staff needed to accomplish the refuge goals and the effects of the current staff shortfall.

Rationale

Current Government staff levels are inadequate to accomplish the work of the refuge. The refuge relies on volunteers and positions paid by nongovernmental money to accomplish objectives. In 2011–2013, the refuge used more volunteer and nongovernmentally funded positions (12.5 FTEs) than Government-funded positions (10.5 FTEs). Although we are extremely fortunate to have volunteers and nongovernmentally funded positions, for the long term, the refuge cannot rely on these uncertain sources of assistance. The lack of a full-time assigned volunteer coordinator to conduct the recruiting, hiring, training, and logistics for the needed volunteers would continue to affect refuge programs. Providing necessary staff levels through Government-funded positions would provide the long-term consistency required for management excellence.

Funding and Staff Objective 2

Over the life of the plan, increase the refuge's annual base funding to cover all operational costs and increased staff costs while maintaining a 75:25 staff to maintenance capacity ratio.

Strategy

- Brief our regional leaders about the need for an increased and stable budget to eliminate the severe staff shortfall and be able to accomplish the refuge goals.

Rationale

Current annual base funding is a minimum of $200,000 short for funding adequate staff and management. Establishing an adequate annual budget would ensure long-term stability in management programs for the refuge.

Facilities Objective 1

Over the life of the plan, increase refuge housing to accommodate an increase in staff.

Strategy

- Brief our regional leaders about the need for increased refuge housing.

Rationale

The high cost of permanent and temporary housing in the Jackson area is an impediment to recruiting staff to work at the refuge. Having the option of reasonably priced, Government rental housing is an important factor in recruiting quality employees to fill lower-graded positions at the refuge.

The refuge would coordinate with Teton County when planning and constructing new buildings. However, we are under no legal obligation to follow county regulations; coordination with the county would be a courtesy rather than complying with a legal requirement.

Facilities Objective 2

Over the life of the plan, relocate the Calkins House to the Nowlin Gate area.

Strategy

- Move the Calkins House and all outbuildings to the Nowlin Gate area when money becomes available.

Rationale

Relocation of the Calkins House would consolidate refuge housing and eliminate the need to maintain communications and transportation facilities to an outlying facility. This would also allow that part of the hunt unit around the Calkins House to be open for firearms, which could result in a minor increase in elk and bison harvest.

Elk Refuge Road Objective 1

Within 5 years, monitor winter use of Elk Refuge Road to identify the magnitude of use, safety issues, and visitor experience.

Strategies

- Install traffic counters.
- Conduct visitor surveys.
- Share use information with Teton County and identify safety concerns.

Rationale

With baseline information on road use, the staff would be able to address safety concerns and other issues associated with the road.

Elk Refuge Road Objective 2

Within 10 years, manage year-round use of Elk Refuge Road to improve safety and the visitor experience.

Strategies

- Add new regulatory signing to prohibit stopping or parking on or along roadway.
- Permit parking only in designated lots and turnouts.
- Add mounted scopes at turnouts to encourage people to get out of their cars.
- Improve and increase the number of turnouts along the road for winter use.
- Add numbered turnouts (ending at the Twin Creek subdivision) and interpretive information to correspond with a winter auto tour brochure.
- Create and disseminate an interpretive brochure for a winter and summer auto tour route.
- Increase road maintenance (plowing, turnouts, sanding, and pulling ditches) in the winter for safety purposes.
- Work with Teton County to reduce dust abatement.
- Increase enforcement of current regulations.
- Consider moving the entrance kiosk and parking area to the west side of the Elk Refuge Road entrance.

Rationale

High traffic volume and numbers of people using Elk Refuge Road for recreation and exercise creates user conflicts that might lead to safety issues. More

BJ Baker / FWS

Osprey

signing, turnouts, and enforcement would increase user safety. Visitors would have more information available to learn about refuge resources.

Elk Refuge Road Objective 3

Within 5 years, eliminate overnight use of Elk Refuge Road for the opening of the national forest winter range.

Strategies

- Prohibit overnight parking, camping, staging, and tailgating on the refuge associated with antler collection on national forest lands.
- Consider alternate gate opening times, for example, opening the refuge access gate later than the other national forest access gates.
- Use educational outreach to explain the change in management to the public.

Rationale

Refuge System policy does not allow overnight camping on the refuge. This use creates a safety hazard because it obstructs the road for emergency vehicles and other users and substantially increases law enforcement costs for the refuge. Enforcing the restriction on overnight use would help protect roadside resources, reduce traffic congestion, improve visitor and employee safety, and reduce refuge costs.

Partnerships Objective

Work with partners to accomplish mutually beneficial projects including the nonmotorized pathway, aerial photography, GIS mapping, wildlife disease monitoring, and habitat and corridor protection and restoration.

Strategy

- Participate with the town of Jackson and Teton County, and provide data if available, to identify relatively important wildlife habitat and understand the cumulative impacts of development and different development types on wildlife.
- Continue to collaborate with Jackson Hole Trout Unlimited, Rocky Mountain Elk foundation, Snake River Fund, and WGFD to improve the fish-bearing streams for native cutthroat trout.

Rationale

Land use and habitat conditions off the refuge affect wildlife on the refuge. Teton County recently approved a comprehensive land use plan and will be developing regulations to carry out this plan. Sharing resources and close coordination between the refuge and the town of Jackson and Teton County through data sharing and project partnerships would help the refuge meet the habitat and wildlife goal.

6.10 Staff

Current staff within the complex consists of 10.5 permanent full-time employees. Table 21 shows the current staff and proposed additional staff required to fully implement the CCP. Because of the area of responsibility and added complexities of this plan, we would evaluate all grade levels for current staff. If all positions were funded, the staff would be able to carry out all aspects of the draft CCP, which would provide the most long-term benefit to wildlife, habitat, and ecosystems; improve facilities; and provide visitor services. Projects that have adequate budgets and staff would receive priority for accomplishment.

Table 21. Current and proposed staff at the National Elk Refuge, Wyoming.

Government-funded position	*Current position (full-time equivalents [FTEs])*	*Proposed added position (FTEs)*
Refuge manager (GS[1]–485–14)	1	—
Deputy refuge manager (GS–485–13)	1	—
Outdoor recreation planner (GS–0023–12)	1	—
Park ranger (GS–0025–9, visitor center manager)	1	—
Wildlife biologist (GS–486–12)	1	—
Refuge land management officer (GL[2]–1801–9)	1	—
Office assistant (GS–0303–5)	0.5	—
Heavy mobile equipment mechanic (WG[3]–5803–11)	1	—
Maintenance mechanic (WG–4749–9)	1	—
Engineering equipment operator (WG–5716–8)	—	1
Budget analyst (GS–0560–11, business team)	1	—
Rangeland management specialist (GS–454–9)	1	—
Biological science technician (GS–404–5/7)	—	1
Refuge land management officer (GL–1801–7/9)	—	1
Environmental education specialist (GS–0025–7/9)	—	1
Maintenance program supervisor (WG–5716–9)	—	1
Three permanent seasonal park rangers (GS–0025–5/7, winter interpretive naturalists)	—	1.5
Six permanent seasonal biological technicians (GS–404–4, irrigators)	—	3
Eight permanent seasonal park rangers (GS–0025–4, visitor center)	—	4
Two permanent seasonal engineering equipment operators (WG–5716–7)	—	1
Three permanent seasonal park rangers (GS–0025–5)	—	2

[1] GS=General Schedule classification and pay system.

[2] GL= General Schedule classification and pay system for law enforcement officers.

[3] WG= Wage Grade classification and pay system.

This CCP is a broad umbrella plan that provides general concepts and specific wildlife, habitat, visitor services, and partnership objectives over the next 15 years. Stepdown management plans, in turn, provide detail for our managers and employees so they can more effectively carry out the specific actions and strategies in the CCP. Table 22 lists needed plans.

Table 22. Stepdown management plans for the National Elk Refuge, Wyoming.

Stepdown plan	*Planned completion*
Comprehensive disease contingency	2014
Cultural resource management	2020
Fire management	2016
Habitat management	2017
Integrated pest management	2019

Table 22. Stepdown management plans for the National Elk Refuge, Wyoming.

Stepdown plan	*Planned completion*
Inventory and monitoring	2016
Visitor services	2015

6.12 Monitoring and Evaluation

Our agency proposes that the uncertainty surrounding habitat management can be dealt with most efficiently within the paradigm of adaptive resource management (figure 15) (Holling 1978, Kendall 2001, Lancia et al. 1996, Walters and Holling 1990). This approach provides a framework within which we can make objective decisions and reduce the uncertainty surrounding those decisions. The key components of an adaptive resource management plan follow:

- clearly defined management goals and objectives
- a set of management actions with associated uncertainty as to their outcome
- a suite of priority models representing various alternative working hypotheses describing the response of species or communities of interest
- monitoring and assessment of the response of target organisms
- use of monitoring and assessment information to direct future decisionmaking through the selection of a best model

The first three components (goals, actions, and models) are largely defined before initiating an adaptive resource management plan, while the latter two (monitoring and directed decisionmaking) comprise an iterative process, whereby each year the predictive ability of models are tested against what was observed during monitoring. This might result in a new best model, greater support for the existing best model, or new models constructed from emerging hypotheses. In this way, management can evolve as information is gained and uncertainty is reduced.

Development of adaptive resource management plans for habitat management would allow the refuge to "learn by doing," while maintaining a focus on objectives. Knowledge gained from assessing management actions is as integral to the process as the management actions themselves. Emphasizing gaining knowledge about the refuge creates a situation where we can refine its habitat management with feedback between management and assessment. Reducing the uncertainty of habitat management via adaptive resource management plans would greatly help us develop long-term habitat management plans.

6.13 Plan Amendment and Revision

The final CCP will be augmented by detailed stepdown management plans to address the completion of specific strategies in support of the CCP goals and objectives. To determine the need for revision, the CCP will be reviewed annually. A revision would occur if and when significant information became available, such as a change in ecological conditions. Revisions to the CCP and the stepdown management plans would be subject to public review and compliance with the National Environmental Policy Act.

At a minimum, the final plan will be evaluated every 5 years and revised after 15 years.

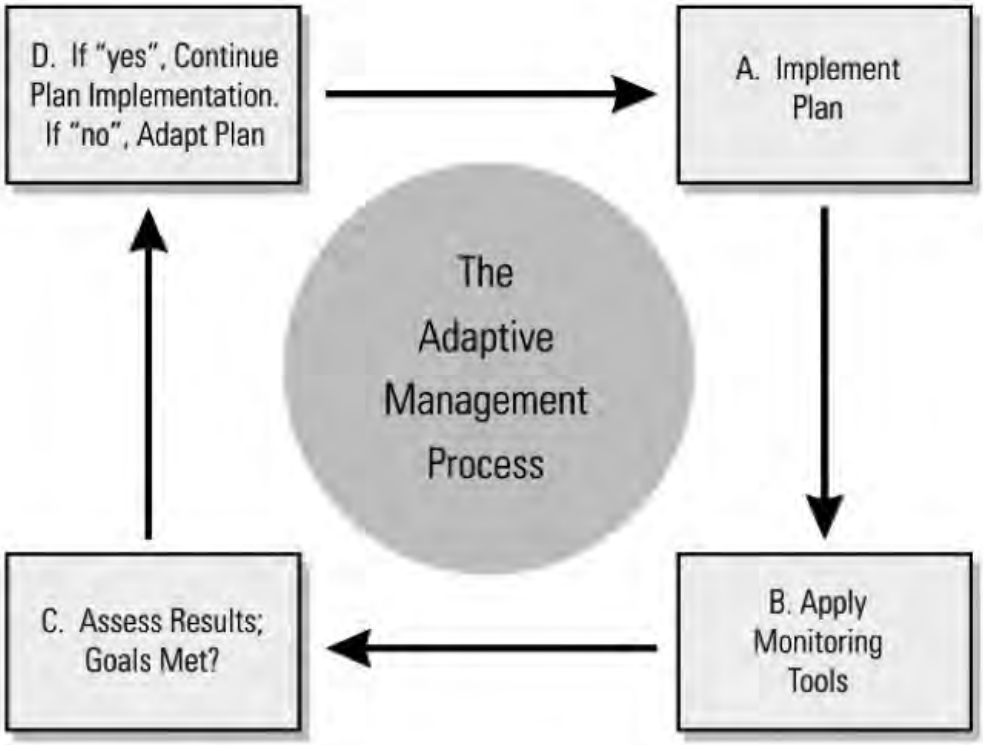

Figure 15. The adaptive resource management process.