CHAPTER 4—Management Direction

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Swan Valley Conservation Area

This chapter contains the management direction for the Benton Lake Refuge Complex. Achieving sustainable systems with long-term productivity will be emphasized. Management efforts will focus on supporting and restoring ecological processes, including natural communities and the dynamics of the ecosystems of the northern Great Plains and northern Rocky Mountains. At Benton Lake Refuge wetland units will be managed to focus on restoring the health and long-term sustainability of the wetland basin. Adaptive resource management will be used throughout the complex to ensure progress is made toward achieving objectives and, as needed, to modify management actions.

The conservation of native landscapes is a high priority and will be accomplished by protecting habitats from conversion using a combination of partnerships, easements, and fee-title lands and through the active management and proactive enforcement of easements. Partnerships in the Muddy Creek and Lake Creek watersheds are important for improving the health of the Benton Lake Refuge wetlands. Management actions, such as prescribed fire, grazing, and invasive species control, will be used to support the resiliency and sustainability of Service-owned lands throughout the refuge complex.

Appendix B contains the required compatibility determinations for public uses and management actions associated with this CCP, and appendix H describes the fire management program for the refuge complex.

4.1 Goals, Objectives, and Strategies

This section discusses goals, objectives, and strategies that serve as the steps needed to achieve the

CCP vision. While a goal is a broad statement, an objective is a concise statement that describes 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 complex staff will carry out the actions in the objectives and strategies. The rationale for each objective provides context such as background information, assumptions, and technical details.

A major objective of this CCP is to establish partnerships with landowners, volunteers, private organizations, and county, State, and Federal natural resource agencies. This has been woven into the objectives and strategies that follow across all goals. In particular, landowners will be informed of opportunities to take part in compensated habitat protection programs (such as conservation easements). Opportunities exist to enhance or establish new partnerships with nonprofit organizations, sporting clubs, community organizations, and educational institutes.

Another process that will be applied across all goals is adaptive resource management (ARM) to help in inventory, monitoring and research. The Service proposed that the uncertainty surrounding habitat management could be dealt with most efficiently within this paradigm (figure 15) (Holling 1978, Kendall 2001, Lancia et al. 1996, Walters and Holling 1990). This approach provides a framework within which objective decisions can be made and the uncertainty surrounding those decisions reduced. Briefly, the key components of an ARM 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 choosing a best model.

The first three components (goals, actions, and models) are largely defined before initiation of an ARM plan, while the latter two (monitoring and directed decisionmaking) constitute an iterative process, whereby each year the predictive ability of models

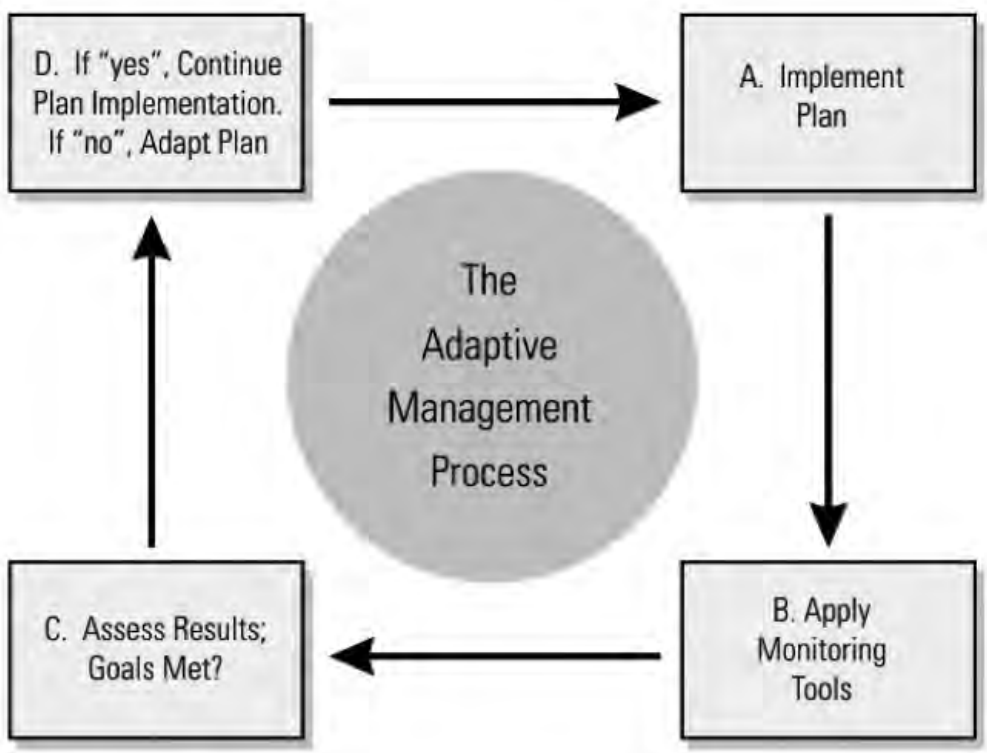

Figure 15. The adaptive resource management process.

are tested against what was observed during monitoring. This may 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 more information is gained and uncertainty is reduced.

The development of ARM plans for habitat management, for example, will allow the refuge complex to learn by doing, while supporting a focus on management objectives. Knowledge gained from assessing management actions is considered as integral to the process as the management actions themselves. This emphasis on gaining knowledge about the refuge complex creates a situation whereby the refuge complex can refine its habitat management in a feedback between management and assessment. Reducing the uncertainty of habitat management via ARM plans will greatly help the refuge complex in development of long-term habitat management plans.

Landscape Conservation Goal

Actively pursue and continue to foster relationships within the Service, other agencies, organizations, and private partners to protect, preserve, manage, and restore the functionality of the diverse ecosystems within the working landscape of the refuge complex.

Background Information

The refuge complex is located in an area that is designated as a high priority for landscape conservation and linkage protection by many conservation partners including MFWP, National Fish and Wildlife Foundation, TNC, The Conservation Fund, Ducks Unlimited, Trout Unlimited, Pheasants Forever, American Wildlands, Yellowstone to Yukon Conservation Initiative and the Blackfoot Challenge. Many of these organizations are involved in transboundary conservation, protecting and connecting habitat in the United States and Canada. Strong partnerships have already been developed to meet the challenges of climate change and wildlife management and conservation.

Climate Change Objective 1

Carry out at least five management actions in the next 15 years that improve resiliency of wildlife and habitats to adapt to the effects of climate change.

Strategies

- Address climate change stressors through preservation of large blocks of functional land that have natural processes, which maximizes resiliency.
- Work cooperatively with partners to improve condition of landscape to increase resiliency and seek more opportunities to work with partners to address climate change issues including restoration projects on Service-interest lands.
- Participate in all aspects of the Great Northern LCC and the Plains and Prairie Potholes LCC to understand climate change impacts locally and improve the condition of the landscape and increase resiliency at the local level.
- Conduct baseline monitoring of habitat conditions to measure effects of climate change.
- Support existing weather station and river gauges throughout complex.
- Collaborate with USGS and others to obtain information on climate change and its applicability to management of the complex.
- Restore grasslands, forests and wetlands to enhance carbon sequestration throughout the refuge complex.
- Work cooperatively with NRCS conservation programs, such as CRP, in refuge complex watersheds such as Lake Creek and Muddy Creek.
- Address climate change stressors through management that emulates natural processes.

Rationale. Climate change is contributing to the loss, degradation, and fragmentation of current habitats and will likely create unique new habitats as species redistribute themselves across the landscape. In addition, climate change is interacting with nonclimate stressors—such as land use change, wildfire, urban and suburban development, and agriculture—to fragment habitats at ever-increasing rates. Protecting and restoring contiguous blocks of habitat, and using linkages and corridors to enhance connectivity between habitat blocks, will likely facilitate the movement of fish and wildlife species responding to climate change.

The refuge complex is located in two LCCs—the Great Northern and the Plains and Prairie Potholes. These LCCs are a conservation alliance of science and management with other bureaus in the DOI,

other Federal agencies, the State natural and wildlife resource offices, Canadian Provinces of British Columbia and Alberta, and academic and other nongovernmental organizations. LCC products may include resource assessments, climate model applications to proper scale, vulnerability assessments, inventory and monitoring protocols, and conservation plans and designs. Many of these products will be developed collaboratively with DOI Climate Science Centers and other science providers (for example, USGS Science Centers, USDA Forest Service Research Stations, and universities). In the face of accelerating climate change and other twenty-first-century conservation challenges, LCCs will continually seek out new scientific information, assess the effectiveness of conservation actions and make necessary adjustments as new information becomes available. With active participation by complex staff, this recurring feedback process will help staff address uncertainties on the landscape and transform new knowledge into more effective conservation plans and actions on the ground.

To understand the effect of climate change on refuge complex habitats and resources, baseline inventories and longer term monitoring of key indicators need to be developed. Temperature, precipitation and runoff are likely to be sensitive to climate change and by maintaining these monitoring stations within the refuge complex, staff will have a better understanding of how global changes are translating to local effects. Collaborating with others such as the USGS, LCCs, and the Service's Inventory and Monitoring Program will strengthen this effort by bringing more technical expertise, scientific credibility and a connection to climate changes outside of the refuge complex.

Managing complex lands in a healthy vigorous state dominated by native species can increase carbon sequestration. Carbon dioxide from the atmosphere is taken up by plants and stored as carbon in biomass (for example, tree trunks, leaves and roots) or stored as organic carbon in soils. Plants and soil have extraordinary capacity to remove and store atmospheric carbon, thus diminishing greenhouse gases. Recent work by the USGS and Ducks Unlimited has shown that restoration of previously farmed wetlands results in rapid replenishment of soil organic carbon (Gleason et al. 2005).

CRP is among the most important land use strategies for sequestering stored organic carbon and, in addition, contributes significantly to controlling soil erosion losses, restoring soil quality, providing wildlife habitat, and protecting air and water quality (Rice and Owensby 2001). The CRP program also illustrates the potential to sequester carbon in soil by converting cropland to grass cover. Gebhart et al. (1994) reported for the Great Plains that 21 percent of carbon lost by decades of intensive tillage was recovered within 5 years under CRP, with carbon sequestration rates of 4,357–5,990 pounds per acre each year.

Restoration to native grasses is more expensive to establish but has a higher carbon storing potential than exotic grass mixtures. Further, it has been found that in natural ecosystems of perennial plants, annual biomass production below ground generally exceeds that aboveground. (Milchunas and Lauenroth 1993).

Climate Change Objective 2

To decrease greenhouse gases in the atmosphere that lead to accelerated climate change, aggressively sequester carbon and use best management practices to meet stewardship responsibilities; manage lands, facilities, travel, vehicles, and vessels; and become carbon-neutral by 2020.

Strategies

- Throughout the complex, conduct an energy audit on all buildings and continue to carry out energy saving strategies.
- Designate a staff member to carry out and share energy saving strategies that staff can use to reduce energy consumption on the refuge complex.
- Reduce energy use in buildings by implementing energy efficient projects—upgrade insulation, heating systems, windows and doors.
- Expand the photovoltaic system at the complex headquarters.
- Employ energy saving practices such as, unplug office equipment when not in use, buy energy star products, recycle, buy recycled products, install high-efficiency lighting, unplug chargers when not in use, lower thermostats, set water heaters to 120–130 °F, enable the "sleep mode" feature on computers, configure computers to "hibernate" automatically after 30 minutes of inactivity, and shut down computers at the end of the day.
- Incorporate "green" building principals and construction practices in construction projects. New buildings and additions should be designed to maximize efficiency and should be equipped with the most energy efficient heating and cooling systems, and appliances.

- Use renewable energy sources for infrastructure—wind power, solar power, and geothermal energy technologies.

- Replace current vehicles with energy efficient models, and consider alternative fuel vehicles when possible.

- Reduce fuel consumption in existing vehicles by implementing conservation strategies (such as, check tires to make sure that there is proper inflation, change oil as directed by the manufacturer, and by checking air filters monthly and changing when needed).

- Reduce travel by using teleconferencing, video conferencing, Webinars, and WebEx.

- Manage habitats to maximize carbon sequestration.

Rationale. This objective is identified in the Service's climate change strategy. Methods for accomplishing carbon neutrality include reducing the carbon footprint of the refuge complex and increasing carbon sequestration on refuge complex lands. The refuge complex is continuing to expand. As more infrastructure is added, it should be evaluated for energy efficiency and upgraded to reduce energy consumption.

The Service's land management activities for wildlife have an associated carbon footprint. To achieve carbon neutrality, the Service must assess and reduce this footprint to the greatest extent possible, while still achieving the Service's mission. The Service should consider how to reduce emissions while achieving the Service's highest land management priorities, a process that involves evaluating green energy alternatives, considering trade-offs, and making difficult choices.

Refuge managers have a variety of management tools to help them support healthy, vigorous grasslands. The condition of habitat and the tools selected to achieve habitat goals affect sequestration of carbon. For example, the amount of soil organic carbon is greater under a grazing regime than under a haying regime. This is a result of a greater amount of carbon being returned to the pasture as excreta and greater stubble remaining with grazing (Schnabel 2001).

Restoration of eroded and degraded soils provides a large potential to sequester soil organic carbon. DNC that has been planted on some of the waterfowl production areas is often similar in composition and structure to CRP, which has been found to increase sequestration of soil organic carbon.

Preserving Intact Landscapes Objective 1

Over the next 15 years, protect 170,000 acres of wildlife habitat (grassland, wetland, riparian areas, sagebrush-steppe, and forest) that support intact, functional landscapes, protect high-priority habitat and linkage zones for Service trust species, increase resiliency for climate change and other stressors and support working landscapes within refuge complex conservation areas.

Strategies

- Work with other Service programs such as realty and the Partners for Fish and Wildlife to engage and meet with interested landowners, to set priorities, and to buy conservation easements.

- Regularly meet with county commissioners, State and Federal agencies, nongovernmental conservation organizations and other participating partners to provide updates and coordination on conservation easement purchases and program progress.

- In the Swan Valley, actively work to strengthen existing partnerships and develop new partnerships with landowners, county commissioners, State and Federal agencies, nongovernmental conservation organizations and others to develop the newly established Conservation Area.

- Pursue funding to buy easements in established conservation areas from congressional appropriations, private donations, partnerships with nongovernmental organizations and securing other non-Federal sources of funding.

- Host informational tours to share examples of successful conservation collaboration between the Service and partners.

- Fully carry out the Service's SHC initiative, which will refine and update priorities within conservation area boundaries for buying conservation easements.

- Develop, take part in, and collaborate on monitoring that informs landscape protection, SHC and ARM, such as the Annual Breeding Waterfowl Surveys in the PPPLCC's Prairie Pothole Region in Montana and in the Swan Valley CA.

- Establish a complex representative to regularly engage with the Great Northern LCC and the Plains and Prairie Potholes LCC.

- Evaluate and explore new areas and partnership opportunities within the refuge complex to establish conservation areas and increase the opportunities for landowners to take part in conservation easement programs.

- Hire 1.5 FTE wildlife refuge specialists to support land acquisition and work with the realty program.

- Hire 0.5 and 1.0 FTE wildlife refuge specialists to manage conservation easement programs in Swan Valley and Blackfoot Valley CAs.

- During the first 5 years of the plan, staff will work closely with local communities and partners to develop a strategic approach to acquisition within the Swan Valley Conservation Area.

Rationale. Within the refuge complex, the Rocky Mountain Front, the Blackfoot Valley and the Swan Valley have been identified as priority areas where protecting intact, functional landscapes will have significant benefits for Service trust species including grizzly bears, bull trout, trumpeter swans, lynx, waterfowl and other priority migratory birds. Conservation areas have been established in each of these landscapes that enable the Service to work with willing landowners to buy perpetual conservation easements.

The Service has had a successful history of buying conservation easements and protecting intact, functional landscapes in the Blackfoot Valley since 1994 and the Rocky Mountain Front since 2005. One key to this success is building partnerships internally and externally. In the newly established Swan Valley CA, building these partnerships will be a very high priority, especially during the first 3–5 years of the plan. Service staff will be working with landowners, county commissioners, State and Federal agencies, nongovernmental conservation organizations, and other interested groups to develop a successful conservation easement program in the Swan Valley CA.

Within the Service, having staff from the refuge complex, the Partners for Fish and Wildlife Program and the realty program engaged in each landscape has been a formula for success. In the newly estab-

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One of many wetlands in the Rocky Mountain Front Conservation Area.

lished Swan Valley CA and any future conservation areas, this level of internal partnership and commitment is likely to be necessary to be successful. In addition, 1.5 FTE are necessary to establish a full-time position in the Blackfoot Valley and Swan Valley CAs for the successful implementation of conservation easement objectives.

Based on the history of funding and staff availability for buying easements within the refuge complex, a total of 170,000 acres over the next 15 years is considered a reasonable objective. This will include 120,000 acres for the Rocky Mountain Front CA, 45,000 acres for the Blackfoot Valley CA and 5,000 acres for the Swan Valley CA over the life of the plan. These acre estimates are based on several variables within each CA: acquisition averages over the last five years, high variability in annual sources of funding such as LWCF, average parcel size, land values, and the availability of willing sellers. Historically, the number of landowners interested in easements exceeded the available money. Decisions among conservation areas will be made through consensus based on biological values, willing sellers, sources of funding and opportunity.

Priorities within projects have been identified in land protection plans published by the Service in 2011 for each conservation area (USFWS 2011f). These priorities will need to continue to be evaluated and revised using SHC. SHC is a way of thinking and doing business that requires the Service to set biological goals for priority species populations, helps the Service make strategic decisions about conservation efforts, and encourages the Service to constantly reassess and improve its actions. These are critical steps in dealing with a range of landscape-scale resource threats such as development, invasive species, and water scarcity—all magnified by accelerating climate change. SHC incorporates five key principles in an ongoing process that changes and evolves. These include biological planning (setting targets), conservation design (developing a plan to meet the goals), conservation delivery (implementing the plan), monitoring and adaptive management (measuring success and improving results) and research (increasing understanding). LCCs are fundamental units of planning and science capacity to help the Service and its partners carry out SHC. Having a staff member engaged with the LCCs will improve the refuge complex's efforts to carry out SHC.

In addition to established conservation areas, the Service has the authority to buy wetland and grassland easements throughout most of the refuge complex through the Federal Duck Stamp Program. Federal Duck Stamp funding targets important migratory bird habitat. To use this money strategically (SHC), the Service is currently working on updating models of wetland use by breeding waterfowl in the PPPLCC's Prairie Pothole Region in Montana. These priorities will be consistent with priorities in the eastern part of the Prairie Pothole Region that target unprotected wetlands with more than 25 breeding duck pairs per square mile and are at high risk of degradation. In addition, the Intermountain West Joint Venture is developing similar models of wetland use by breeding waterfowl in the Swan Valley to refine wetland protection priorities in this landscape.

During the course of the development of the CCP, the Montana Legacy Project was completed in Western Montana. The project is the culmination of an unprecedented partnership between private and public entities to conserve 310,000 acres of western Montana forest land owned by Plum Creek Timber Company. The Legacy project included portions of private land within the Swan Valley. In order to strategically address the concerns of the Swan Valley, Service staff recognized the need to proceed slowly with the inclusion of local communities and partners within the Swan Valley to ensure targeted conservation on private lands

Preserving Intact Landscapes Objective 2

Protect Service interests throughout the refuge complex by annually coordinating, monitoring, and collaborating with entities engaged in activities such as industrial or commercial development and agricultural land conversion.

Strategies

- Actively engage in planning efforts by industrial and commercial interests where it influences complex interests by providing relevant Service data and input during the development and siting phases, reviewing and responding to planning documents—such as an EA or environmental impact statement (EIS)—and where proper, participating in postimplementation monitoring.

- Attend training on the regulations, effects, and mitigation techniques for industrial, commercial, and agricultural developments that affect resources.

- Proactively collaborate with partners and LCCs in landscape-wide regional threat assessments.

Rationale. In addition to those activities that directly harm the natural resources located on fee-title and easement lands, the Service is concerned with any potential effect on other parts of the refuge complex.

Certain activities, such as development and land conversion, have the potential to have far-reaching and cumulative effects on resources throughout the refuge complex.

Habitat Goal

Actively conserve, restore, and manage upland and wetland habitats across the northern prairies and intermountain valleys of the refuge complex, through management strategies that perpetuate the integrity of ecological communities.

Grasslands Objective 1

Within the first 5 years of the plan, complete rangeland assessments on fee-title native grassland tracts greater than 80 acres in size (10 tracts totaling 12,420 acres).

Strategies

- Evaluate existing native plant communities in comparison to the historical climax plant community (HCPC) described in the corresponding NRCS Ecological Site Descriptions.
- Summarize the degree to which current vegetation indicates a decline in integrity of native vegetation in a report. Use these results to rank grasslands for future management action.
- Hire one seasonal technician [for 2 seasons] to conduct native grassland assessments.

Rationale. Interpreting Indicators of Rangeland Health Technical Reference 1734–6 Version 4 (Pellant et al. 2005), is recognized by range professionals as the basis for inventory and assessment of rangeland health. This publication was a collaborative effort between the BLM, NRCS, the Agricultural Research Service and the USGS's Forest and Rangeland Ecosystem Science Center. The publication promotes the concept of rangeland heath as an alternative to range condition and assessing rangelands through ecological status concepts. These principles combined with NRCS Ecological Site Descriptions, provide the best available science for assessing the refuge complex's prairie tracts.

Native grassland tracts greater than 80 acres in size were found to be a reasonable break point for conducting rangeland assessments within the refuge complex. Remaining native grassland tracts in the refuge complex are made up of smaller fragmented areas (less than 80 acres) typically represented by rocky hill tops, wetland edges and fence line corners making them difficult to manage separately from their tame grass dominated surrounding.

Ten tracts were identified for rangeland assessments: Benton Lake Refuge and nine waterfowl production areas—Blackfoot, Ehli, Furnell, H2–O, Jarina, Kingsbury Lake, Kleinschmidt Lake, Sands, and Savik.

Grasslands Objective 2

Within 15 years, manage 10 high-priority, fee-title, native grassland tracts to support plant communities at greater than 80 percent of their HCPC or within their ecological site-specific reference state.

Strategies

- Manage grasslands using fire, grazing, rest, and if necessary, haying cycles. Timing and combinations of treatments may be altered to support native plant communities or trend toward restoration of their HCPCs. Attention will be given to diversity of vegetative structure within each management unit.
- Priority will be given to invasive species management within native grasslands using IPM and EDRR.
- Monitor species composition and vegetative trends to evaluate the success of current management regimes.
- Identify and monitor key wildlife species as added indicators of grassland health and management success.
- Hire one seasonal biological technician for native grassland management throughout the refuge complex.

Rationale. Grasslands within the refuge complex were formed as the result of climatic conditions, geological parent materials, fire, biotic factors, and the influences of natural herbivory (NRCS 2005) The HCPCs for each of these unique combinations can be described by evaluating relict areas, and other areas protected from excessive disturbance. Within the refuge complex, the HCPCs are generally dominated by cool-season grasses, with a minor component of warm-season grasses, native forbs, native shrubs and an absence of nonnatives.

Traditional theories of plant succession leading to a single HCPC, however, are inadequate for understanding the refuge complex succession of plant

communities in grasslands (Briske et al. 2005). Grasslands are more aptly described using state-and-transition vegetation dynamics in a nonlinear framework. A "state" is an alternative, persistent vegetation community that is not simply reversible in the linear successional framework. States are seral stages, while pathways between states are "transitions." Transitions are triggered by climatic events such as wildland fire or by management such as grazing, farming, and prescribed fire. The HCPCs, and their associated states and transitions, have been described by NRCS for most of the grassland types on the refuge complex (NRCS 2005).

Historically, HCPCs transitioned to other seral states due to drought, grazing, precipitation, and fire regimes. These transitions did not compromise the long-term resiliency or health of the grasslands. In addition, these different states were preferred by different wildlife species providing a variety of grassland habitats and resources over time. Departure from this historical range of variation can occur under continued adverse effects such as colonization and recruitment of noxious weeds, improper management actions, extended drought and changes in the natural fire regime. The HCPC species are gradually outcompeted by lower successional species. This shift in species composition disrupts ecological processes, impairs the biotic integrity of the site and restricts the system's ability to recover to higher seral states. Thus, the site loses much of its resiliency (NRCS 2005).

The objective is to manage grasslands within the refuge complex so that they do not cross a threshold where resiliency is lost and the system is no longer able to recover to higher seral stages, yet still allowing for departures from the HCPC that are part of the historical states and transitions of that grassland type. NRCS grassland descriptions do not specifically state 80 percent as a threshold, however, this seems to be a reasonable starting point and as management and evaluation progresses this can be reevaluated. Although research consistently shows that precipitation is the principle factor altering productivity on ecological sites in the northern Great Plains (Heitschmidt et al. 2005), rotational management prescriptions for grazing, fire and rest emulate historical transitions, contribute to HCPC resiliency and provide a diversity of habitats that appeals to a wide variety of grassland-dependent species.

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Burrowing Owl

Across the fee-title grasslands, nonnative, invasive species are one of the largest threats to supporting HCPC resiliency and function. Preventing the introduction of invasive species is the first line of defense against invasions. However, even the best prevention efforts will not stop all invasive species introductions. EDRR efforts increase the likelihood that invasions will be addressed successfully while populations are still localized and population levels are not beyond that which can be contained and eradicated (NISC 2003). Once populations are widely established, all that might be possible is the partial mitigation of negative effects. In addition, the costs associated with EDRR efforts are typically far less than those of long-term invasive species management programs.

Grasslands Objective 3

Within 15 years of the approved plan, convert up to 600 acres of tame grass stands, on five high-priority fee-title tracts, to native-dominant perennial herbaceous cover including several species of native forbs.

Strategies

- Converting up to 600 acres of tame grass to native plantings on the complex will include targeting 207 acres on Benton Lake Refuge.
- Identify cooperators and negotiate farming agreements and budget seeding and chemical costs for planned planting years.
- Use cooperative farming agreements for 2–4 years to prepare the seedbed before planting native species.
- Hire 0.5 FTE maintenance worker to convert tame grass stands to native cover and monitor results.

Rationale. Replanting tame grass to native grasslands, with subsequent treatments of prescribed fire and grazing, will emulate historical processes and gradually recover soil mycorrhizae, invertebrate diversity and symbiotic relationships. Once they are reestablished, soil erosion should be negligible. Carbon sequestration and nutrient cycling will be significantly greater in the more floristically diverse community expected with native plantings.

Tame grass stands that were traditionally hayed are more likely to be burned or grazed once they are planted to native species. These types of management should replenish and improve the nutrient cycles rather than mining the soil nutrients through rotational haying systems.

Priority for planting native species is given to tracts with tame grass stands that have become decadent or overrun with undesirable introduced cool-season grasses—especially fields that are next to, or within, high-priority prairie tracts—and that are compatible with grazing and fire treatments. Factors taken into consideration to assure establishment and long-term management include, (1) surrounding adjacent vegetation and (2) availability and suitability of management tools (prescribed grazing and fire). Tame grass tracts where the surrounding adjacent landscapes are dominated by agricultural crops and tame grass stands were identified as a lower priority for native planting. In these areas, resource costs associated with protecting native plantings from invasion of cool-season exotic grasses and noxious weed infestations are prohibitive.

There are approximately five priority tracts within the refuge complex (Benton Lake Refuge; Big Sag, H2–O, Kingsbury Lake, and Sands WPAs) that have about 1,651 acres of tame grass that could be planted to native grass species using the criteria described above. Planting native grass species requires higher input costs ($156 per acre), traditionally takes longer (3–4 years) and is more difficult to establish than tame grass ($106 per acre and 1–2 years to establish). Given the higher input costs and difficulty establishing, planting up to 600 acres of the priority tame grass stands to native species is considered reasonable over the next 15 years. The 207 acres specifically targeted for Benton Lake Refuge will depend on available resources and consider the demands required for the ecological recovery of the wetland basin on the refuge. Monitoring these plantings will be important to assess the success and to identify improvements in techniques and efficiencies that could reduce costs over time.

Grasslands Objective 4

Over the life of the plan, support 1,905 acres of low-priority, fee-title, tame grass and DNC in good-to-fair condition based on species composition (25-percent legume, 75-percent wheatgrass mix), vigor (seedhead production greater than 25 percent), and litter accumulation of less than 6 inches in the duff layer.

Strategies

- Manage 1,055 acres of DNC (currently in good to fair condition) using cooperative rotational systems (primarily haying).
- Replant 850 acres of DNC (currently in poor condition and not suitable for native plantings) back to DNC using cooperative farming agreements for 2 to 4 years to prepare the seedbed before replanting DNC.
- Treat invasive species within tame grasslands using IPM and EDRR.
- Identify cooperators, negotiate farming agreements, and budget seed and chemical costs for planned planting years.
- Hire 0.5 FTE maintenance worker to support DNC grassland management.

Rationale. Tame grass stands established for wildlife cover should ideally be comprised of 75-percent grasses and 25-percent alfalfa (Duebbert et al. 1981). Grasses planted with legumes are taller and the overall stand productivity is higher. Taller, dense vegetation, in turn, has been related to higher waterfowl nest densities and success (Higgins and Barker 1982, Arnold et al. 2007).

Tame grass stands that have been successfully established on good sites can be expected to provide desirable vegetative structure for at least the first 6 growing seasons and to keep the composition for at least the first 10 growing seasons, and probably longer for most stands (Higgins and Barker 1982, Devries and Armstrong 2011). Decreasing vigor can be identified by deviations from the optimal 75:25 percent mix, as well as reduced vigor measured by seedhead production. In drier parts of the PPPLCC's Prairie Pothole Region, such as the refuge complex, an approximate guideline of less than 25-percent seedhead production is recommended (personal communication, Ducks Unlimited). Declining stand quality often also coincides with a buildup of litter (Duebbert at al 1981, Higgins and Barker 1982, Devries and Armstrong 2011). The threshold of 6 inches is based on staff observations and experience managing tame grass stands within the refuge complex. Because tame grass stands are generally a lower priority than native grasslands on the refuge

complex, indicators have been chosen that can be rapidly assessed with informal monitoring.

Management of low-priority fee-title tame grass and DNC within the refuge complex was divided into two categories, (1) Maintenance of 1,055 acres of DNC in good to fair condition and (2) replanting 850 acres of DNC currently in poor condition. These figures do not include the 1,651 acres of degraded tame grass stands identified and grouped as high-priority areas for native grass plantings (Grasslands Objective 3).

The 1,055 acres of DNC in good to fair condition may be managed primarily using rotational haying systems to sustain longevity, species composition, vigor and reduce litter accumulation. Rotations provide a diversity of structural habitats within the management units, which appeals to a wide variety of grassland-dependent species. Occasional prescribed grazing or fire may be implemented within specific tract rotations.

The 850 acres of tame grass currently in poor condition should be prioritized for cooperative farming and planting back to DNC. As tame grass stands continue to degrade over time into poor habitat conditions the initial resources to address these habitat needs grows substantially.

Regardless of tame grass condition, treating invasive species infestations in these units will still be a priority. Emphasis will be given to species that have been identified by the State of Montana as noxious. EDRR efforts increase the likelihood that invasions will be addressed successfully while populations are still localized and population levels are not beyond that which can be contained and eradicated (NISC 2003). Once populations are widely established, all that might be possible is the partial mitigation of negative effects.

Grasslands Objective 5

Within 15 years, begin removal of 3.5 miles of tree shrub plantings, starting with high-priority large native prairie tracts.

Strategies

- Remove up to 3.5 miles of interior tree plantings on Benton Lake Refuge that cause fragmentation of otherwise contiguous grassland blocks.
- Use forestry cutters for tree removal. Apply herbicide treatment for two growing seasons following tree removal.
- Evaluate areas for grass seeding after trees have been successfully removed.

Rationale. The refuge complex has approximately 25 miles of nonnative tree plantings. Most of these plantings occur on the Benton Lake Refuge. The 3.5-mile figure represents nonnative tree plantings within blocks of native prairie grasslands. Nonnative tree plantings contribute to fragmentation, depredation and parasitism, which negatively affect grassland-dependent migratory birds (Bakker 2003). Some of these species include species of concern, such as marbled godwits and chestnut-collared longspurs.

Forestry cutters are available within the region and may be reserved for specific projects. The tree removal may be accomplished using existing Service staff in the fall and winter months, which will result in cost savings. Based on past operations, it takes approximately 8 hours to remove 1 mile of tree planting.

Wetlands and Riparian Areas Objective 1

Over the next 15 years, manage and protect water quality for wetlands and riparian habitats on fee-title lands within the refuge complex such that there is minimal hazard to wildlife from contaminants.

Minimal hazard is defined as conditions where "hazardous constituents may be elevated in one or more ecosystem components, but no imminent toxic threat is identified" (Lemly 1995, DOI 1998). The exact numerical value will vary with the contaminant and the constituent (such as water or soil).

Strategies

- Develop a baseline assessment of water quality in relation to high-priority contaminants on fee-title wetlands and riparian areas throughout the refuge complex.
- For wetlands and riparian areas above the minimum hazard threshold, conduct proper onsite remediation to reduce contaminants and monitor results.
- For refuge complex wetlands and riparian areas above the minimum hazard threshold for contaminants, work with neighboring landowners, watershed groups, nongovernmental organizations and other government agencies to reduce offsite contributions to contaminants whenever possible.
- On Benton Lake Refuge, dry Units 1 and 2 as needed to reduce selenium below the minimal hazard threshold. During dry cycles, use prescribed fire to increase selenium volatilization from vegetation and expose sediments.

- On Benton Lake Refuge, reduce selenium inputs by not pumping in 4 out of the next 15 years and manage the pumped water in the remaining 11 out of 15 years to prevent long-term selenium accumulation.

- On Benton Lake Refuge, modify existing infrastructure and restore wetland topography as needed to reduce and keep selenium below the minimum hazard threshold.

- On Benton Lake Refuge, monitor selenium levels closely to determine if management actions to reduce and keep selenium below the minimum hazard threshold are effective.

- For Benton Lake Refuge, meet annually with MFWP, other partners, and the public to share the previous year's progress on selenium reduction and the plans for selenium reduction and management for the next year.

Rationale. There are hundreds of substances known to affect wetlands and waterbodies, however, there are nine that are common in the western United States and of particular concern. These include salinity, dichlorodiphenyltrichloroethane (DDT) and the trace elements arsenic, boron, copper, mercury, molybdenum, selenium and zinc (DOI 1998). In addition, lead can be a concern when birds feed in hunted areas and ingest lead pellets.

For wetlands on fee-title land managed by the Service, any contaminant at levels shown to cause reproductive impairment in wildlife are unacceptable. Information from sources like the Montana Department of Environmental Quality and the EPA is available on the biological effects of these contaminants that can be used to define what level, and in what constituent (such as water, soil, or wildlife), is appropriate for defining the minimum threshold for a given wetland.

In 1995, a survey of contaminants from 10 sites within the district was conducted to determine if trace elements were accumulating in either sediment or the aquatic food chain of wetlands (Gilbert et al. 1995). Elevated levels of lead, boron, and selenium were detected in several locations. The concentrations did not appear to pose an immediate threat to wildlife resources, but continued monitoring was recommended. Other fee-title wetlands within the refuge complex that have not been tested before should have at least an initial baseline survey completed, especially those with potential sources of contaminants nearby.

In 1998, the DOI initiated a program to study the quality of irrigation drainage, both surface and subsurface water, and its potential effects on humans, fish, and wildlife in the western United States (Knapton et al. 1988). This program included a study of the Sun River Irrigation Project, from which Benton Lake Refuge receives its pumped water. The study found contaminant concentrations in water, sediment, and biota at Benton Lake that were moderately to considerably higher than established standards, with selenium having the greatest potential for toxicity (Lambing et al. 1994, Nimick et al. 1996). Selenium is of particular concern in Units 1 and 2, where moderate-to-high hazard levels have been documented (Nimick et al. 1996; Zhang and Moore 1997; unpublished data on file at the refuge from 2006, 2008, and 2011).

The toxic threat to wildlife from selenium is based on the degree of contamination present and the extent of exposure. The "minimum hazard" level is defined as the concentration of selenium in various ecosystem components for which "no imminent toxic threat is identified" (Lemly 1995, 2002). For water this is less than 2 micrograms per liter, for sediment

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Blackfoot Valley Conservation Area

it is less than 2 micrograms per gram, for macroinvertebrates it is less than 3 micrograms per gram, and for aquatic bird eggs it is less than 5 micrograms per gram. These values can be combined to create an overall hazard assessment for a given area, such as the wetland units on the refuge (Lemly 1995, 2002). Recent monitoring data, combined with predictive models, show that Units 1 and 2 could reach selenium levels that are associated with complete, or nearly complete, reproductive failure in sensitive wildlife species in as little as 9 and 17 years, respectively (Zhang and Moore 1997, Lemly 2002, unpublished data on file at the refuge from 2006, 2008, 2011).

Selenium enters the refuge in natural runoff from the surrounding Lake Creek watershed and from water pumped from the Muddy Creek watershed. While natural runoff has contributed most of the selenium loading on the refuge over the last 40 years, the pumped water has contributed approximately 39 percent of the total selenium load (Nimick et al. 1996). Furthermore, the addition of pumped water has reduced drying of wetland sediments, which is the primary way for selenium to leave the refuge via volatilization directly into the air. Not pumping for up to 4 years (but no more than for 3 consecutive years) will reduce the total selenium load by an estimated 100–200 pounds over the next 15 years. In years when water is pumped from Muddy Creek, selenium accumulation can be minimized by rotating flooding among units and flooding to depths that promote sufficient volatilization through drying. Dry periods also create opportunities to use prescribed fire, which will expose sediments and may volatilize more selenium from wetland vegetation (Zhang and Moore 1997). Wetland infrastructure such as dikes, ditches, and water control structures may be modified to facilitate the management of selenium. For example, in order to dry Unit 1 sufficiently, the Lake Creek channel may need to be restored—or a bypass channel may need to be built—to allow natural runoff or pumped water to pass through, or around, Unit 1. Flooding and drying rotations, water control structure modifications, and other management tools will continually be assessed and adjusted through an adaptive management process.

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Seeps like this can release selenium into Benton Lake National Wildlife Refuge wetlands.

For some fee-title wetlands, streams, and rivers on the refuge complex, contaminants may be coming from offsite sources that are not directly under Service management. In these situations, partnerships with neighboring landowners, watershed groups, and other government agencies may be necessary. This is particularly important for Benton Lake Refuge where the source of the selenium is off of the refuge in the Lake Creek and Muddy Creek watersheds. Average concentrations of selenium for pumped water from the Muddy Creek watershed are 3 micrograms per liter, and they are 14 micrograms per liter for natural runoff from the Lake Creek watershed (Nimick et al. 1996, unpublished data on file at the refuge for 2007–11). Based on previous research, a reduction of selenium inputs by 64 percent, with a average concentration of 5 micrograms per liter, in conjunction with seasonal drying, could prevent Units 1 and 2 from reaching toxic thresholds (Zhang and Moore 1997). However, year-long drying, which is planned for Units 1 and 2, may mean that smaller reductions in selenium inputs are necessary.

Since most of the selenium load comes from natural runoff in the Lake Creek watershed, active engagement by refuge staff with partner organizations and landowners in this watershed will be particularly important to reduce the selenium load into the refuge. Most of the seeps in the Lake Creek watershed have been mapped, and major contributors to the selenium load may be located in relatively few places as seeps vary in size, the amount of discharge, and their proximity to Lake Creek and its tributaries (personal communication with S. Brown; Nimick et al. 1996). To achieve permanent reductions in selenium inputs, the source areas will need to be planted to perennial cover and protected with a perpetual conservation easement or bought in fee title by the Service or by its partners and managed as perennial cover. USDA programs, such as CRP, the Conservation Security Program, EQIP, and more, have the potential to establish perennial cover in the watershed. The number of acres in the watershed that will need to be planted to perpetual, perennial cover to achieve sufficient reductions in selenium inputs is currently unknown. Increased coordination with NRCS staff, local watershed groups, and contaminants programs may also lead to other innovative solutions to reduce some of the selenium sources impacting the refuge.

Wetlands and Riparian Areas Objective 2

Over the next 15 years, insure that there is no net increase in selenium contamination throughout the Benton Lake Refuge wetland.

Strategies

- Reduce selenium inputs by not pumping in 4 out of the next 15 years and manage the pumped water in the remaining 11 out of 15 years to prevent long-term selenium accumulation.
- Rotate flooding in Units 3–6 to allow for sufficient dry periods for selenium volatilization to offset selenium accumulation. During dry cycles, use prescribed fire to increase selenium volatilization from vegetation and expose sediments.
- On Benton Lake Refuge, modify wetland infrastructure such as dikes, ditches, and water control structures and restore wetland topography as needed to prevent a net increase in selenium.
- On Benton Lake Refuge, conduct a detailed baseline assessment of current selenium levels and monitor selenium closely over the life of the plan.
- For Benton Lake Refuge, meet annually with MFWP, other partners, and the public to share the previous year's progress on selenium management and plans for the next year.

Rationale. Selenium levels in Units 3–6 on the refuge have previously been found to be elevated above background levels, but are not currently above the minimum threshold (see Wetlands and Riparian Areas Objective 1) (Nimick et al 1996, Zhang and Moore 1997, unpublished data on file at the refuge for 2006). As refuge management is applied to reduce and maintain selenium levels in Units 1 and 2 to below the minimal hazard threshold, it is important that selenium does not begin to accumulate significantly in other units. Selenium levels may rise for a short period of time as a unit is flooded, but sufficient drying and other management techniques, such as prescribed burning, will be used to insure that any accumulation is offset. Restoring wetland topography or modifying infrastructure may be also be used to enhance selenium volatilization and prevent accumulation. The amount of drying needed to off-set selenium accumulation from flooding in the lower units is not currently precisely known, but selenium modeling suggests that there may need to be 2–3 years of drying for each year of flooding (Zhang and Moore 1997).

In addition, no unit will be allowed to accumulate selenium beyond the minimum hazard threshold that could cause reproductive harm in birds (see Wetlands and Riparian Areas Objective 1). To insure that the threshold is not crossed, triggers will be set at values below the threshold. For example, setting a trigger for selenium concentrations in sediment of 1.5 micrograms per gram will help insure that there is sufficient time to act before selenium reaches the 2.0 micrograms per gram threshold.

Under this objective, selenium levels in Units 3–6 should be at, or below, current levels in 15 years. During the first few years of the plan, a detailed baseline of current selenium levels in water, sediment, macroinvertebrates and aquatic bird eggs will be conducted in all units. Monitoring will continue throughout the life of the plan to determine when management should be adjusted.

Wetlands and Riparian Areas Objective 3

Where possible, over the next 15 years restore natural hydrologic processes—wet–dry cycles—for the site-specific hydrogeomorphic condition of wetlands and riparian areas within the refuge complex.

Strategies

- Conduct a hydrogeomorphic assessment of the Swan River Refuge and evaluate other fee-title areas for this type of intensive assessment.
- Work with the Partners for Fish and Wildlife Program, other partners, and private landowners to restore fee-title lands or private land within the refuge complex.
- Monitor water inputs on fee-title lands as necessary to protect water rights.
- Monitor restoration to determine if systems are recovering.

Rationale. Each wetland and riparian system lies within a specific hydrogeomorphic context, which is based on the underlying geology, soils, topography, elevation, hydrology, plant and animal communities and physical anthropogenic features of the surrounding landscape. While hydrology is widely considered by wetland experts to be the most significant of these factors for driving wetland health and function, it cannot be considered outside of a hydrogeomorphic context.

Throughout the refuge complex, most of the wetlands on fee-title lands have not been altered, and any changes to the original hydrogeomorphic condition are due to the surrounding landscape.

However, for some of the wetlands and riparian areas within the refuge complex, the hydrology has been altered. To understand the extent to which alterations are affecting wetland health and integrity, a process known as HGM can be applied. An HGM study assembles known information about the hydrogeomorphic features of a waterbody before alteration, develops an understanding of what the alterations have been and their effect, and then describes possible management actions for improving the health and sustainability of the wetland or riparian area. By continuing to monitor and support water rights—both natural and supplemental—the refuge complex can keep the greatest flexibility for possible management actions to maintain or improve the health of wetlands or riparian areas once the hydrogeomorphic context is understood.

An HGM analysis has been completed for the Benton Lake Refuge (Heitmeyer et al 2009). However, the hydrogeomorphology of Swan River Refuge is not well understood. For example, it is possible that there have been significant modifications to the hydrology that are hidden by thick vegetation. A detailed HGM analysis of the refuge would help staff to understand and manage the hydrology more effectively. Whether or not other fee-title lands could benefit from an HGM analysis would also be evaluated.

Throughout the refuge complex, wetlands may be created, enhanced, or restored. Among these, wetland restoration is the highest priority over enhancement or creation, which will rarely occur. Wetland restoration will occur where a wetland basin was present historically, but has been drained or altered. Restoration returns a wetland to as-close-to-functional historical condition as possible. When wetland restoration projects occur on the refuge complex, monitoring will be conducted to determine if wetland systems are recovering and the restoration is successful.

Most riparian areas in the refuge complex are on private land. Efforts will focus on working with private landowners to better manage and improve the health and vigor of these important and biologically diverse areas through conservation easements and partnerships. The riparian areas on fee-title lands will mostly be treated with rest and protection.

Wetlands and Riparian Areas Objective 4

Where it is not currently feasible to restore full hydrologic function within the refuge complex, annually manage wetlands and riparian areas to emulate the natural hydrologic processes—wet–dry cycles—as for the site-specific hydrogeomorphic condition.

Strategies

- On Benton Lake Refuge, manage natural runoff and pumped water to support the recovery of wetland systems for the long-term sustainability of migratory bird populations and for public enjoyment.
- On Benton Lake Refuge, emulate basin-wide dry cycles by not pumping supplemental water in 4 out of 15 years, but in no more than 3 consecutive years.
- On Benton Lake Refuge, emulate dry cycles of 3 to more than 7 years within individual wetland units by rotating pumped water among units.
- On Benton Lake Refuge, restore wetland topography as needed to emulate hydrologic processes and support wetland recovery.
- On Benton Lake Refuge, modify wetland infrastructure such as dikes, ditches, and water control structures as needed to improve water conservation and the efficiency of delivering water to a specific unit.
- For Benton Lake Refuge, keep the pump house, 4 miles of underground pipeline, and several structures on Lake Creek in working condition.
- On Benton Lake Refuge, develop an Adaptive Resource Management approach over the next 15 years to determine if water management is supporting wetland system recovery.
- For Benton Lake Refuge, meet annually with MFWP, other partners, and the public to share the previous year's progress on wetland recovery and water management plans for the next year.
- At H2–O WPA, natural flow and runoff will be captured, and Blackfoot River flows will occasionally be diverted from April to September to prolong the spring, summer, and fall hydroperiod. If less than historical amounts of water are used, the residual right may be leased to the State.
- At Blackfoot WPA, management of natural wetland basins will emulate natural processes. The drying cycle will be emulated in all wetland basins including mitigation wetland basins. Mitigation wetland basins may be held at lower water levels to emulate natural flows and runoff.

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Greater Short-horned Lizard

- Monitor water inputs on fee-title lands as necessary across the refuge complex to protect water rights.
- Hire a supervisory refuge biologist to carry out ARM, as the restoration proceeds, and other duties at the refuge complex as needed.
- On Benton Lake Refuge, hire a seasonal biological technician to help carry out ARM.

Rationale. The Benton Lake Refuge will be managed to improve wetland health and sustainability. An HGM assessment was completed for Benton Lake Refuge in 2009 (Heitmeyer et al. 2009). This analysis identified several significant alterations to the hydrologic cycles at the refuge. During the first 30 years of the refuge's history, the refuge experienced 10- to 20-year wet and dry cycles that sustained wetland health, plant diversity and wildlife diversity. During dry years, contaminants were volatized, sediments were solidified, robust emergent vegetation such as cattails and bulrush died back, and wetland-dependent wildlife used migration, hibernation, burrowing, or other strategies to survive. Benton Lake experienced a boom of wetland productivity with the return of the wet cycle, and invertebrates and wetland-dependent wildlife took advantage of the newly available resources.

Over the last 50 years, this boom-and-bust cycle has been altered by using pumped water to flood some portion of almost all wetland units every year. This has reduced, or prevented, dry cycles, and, as a result, wet years are less productive because the rejuvenating effects of these dry periods have not occurred. Over the next 15 years, natural runoff and pumped water will be managed on Benton Lake to more closely emulate natural hydrologic processes, including reintroducing dry cycles to the wetlands. Units 1 and 2 may need long dry periods of 7 or more years to volatilize selenium. The remaining units will likely need shorter dry periods of 3–5 years to restore wetland function. Flooding the lower units during summer will continue be avoided to prevent botulism outbreaks. In years when pumping occurs, up to 4,000 acre-feet may be pumped, but it may be less depending on the progress made toward wetland recovery objectives and on the amount of money available to the refuge.

In addition, in 4 out of the next 15 years, the refuge will emulate basin-wide dry cycles by not pumping water in naturally dry years. Synchronizing basin-wide dry cycles on the refuge with the surrounding landscape is expected to increase the beneficial effects of dry years. This will be done to stimulate changes in invertebrate communities, plant communities, and mammalian predators that are not likely to be possible by implementing dry cycles only at the individual impoundment level (Schneider 1999, Murkin and Ross 1999, Krapu et al 2004).

Emulating the natural hydrologic processes on Benton Lake Refuge may require the improvement of water delivery infrastructure and restoring topography within wetland units. For example, in order to move water to the lower units while Unit 1 is dry, the Lake Creek channel may need to be restored, or a bypass channel may need to be built. In addition, the ditches and canals on the refuge have disrupted the original flooding patterns that form the microtopography of the wetland basin. Recontouring wetland units to remove these ditches is expected to support wetland system recovery and ultimately increase wetland productivity (Heitmeyer et al. 2009; personal communication with L. Frederickson, Euliss et al. 2008).

Flooding and drying rotations, water control structures, and other management tools will continually be assessed and modified through an adaptive management process. This will be supported by

intensive monitoring. The management decision to flood or dry each unit will be determined annually. If necessary, more dry time may be conducted in individual units until wetland objectives are met. As needed, units will receive intensive management such as prescribed fire, discing, and herbicide applications. Annual water management plans for the refuge will be developed and shared with MFWP, other partners, and the public.

Moving forward, refuge staff will be using ARM and monitoring feedback loops to inform the decisionmaking process. An added full-time supervisory biologist and seasonal biological technician will be necessary to achieve this objective. A part of the supervisory biologist's time will be focused on developing, adjusting, and providing oversight—through ARM—of the restoration process. The daily restoration monitoring will be conducted by the existing FTE refuge biologist and two seasonal biological technicians, as well as by added technician.

For other units within the refuge complex, some wetland and riparian areas have been altered, but the ability to restore the hydrologic function is limited by legal obligations, such as wetlands created under mitigation agreements, constraints in the surrounding landscape beyond the Service's management controls or by the lack of money. In these cases, the Service will manage these areas by emulating the natural flooding and drying cycles to the extent possible. Across all units of the refuge complex, "emulation" means managing water as closely to the natural hydrology as possible while recognizing that limitations do exist.

Wetlands and Riparian Areas Objective 5

Within 5 years, complete condition assessments on fee-title wetlands and riparian areas throughout the refuge complex.

Strategies

- Evaluate existing wetlands and riparian areas with Level 1 Assessments designed by the MNHP.
- Create a report that summarizes the degree to which current vegetation indicates a decline in integrity of native vegetation and value to wetland-dependent wildlife. Use these results to rank wetlands for future management action.
- Hire one seasonal technician for two seasons to conduct wetland assessments.

Rationale. Wetlands and riparian systems are very dynamic. Flooding and drying cycles have a significant effect on the plant and animal communities that may be present at any given point in time. Because of this variability, vegetation is often the preferred indicator of wetland condition because at least some plants are usually present in a wetland basin making it possible to do surveys in wet and dry years. Many guides have been developed to account for the range of variability for wetland vegetation and what it indicates for wetland condition, including several specifically for Montana (MNHP 2010b, Hansen et al. 1995, NatureServe 2010). The MNHP, in particular, has developed a rapid assessment that can be tailored to the needs of the user. Using these guides that describe the full range of natural variability for a particular wetland type or site, in addition to current vegetation, the Service will assess the degree to which the integrity of the native wetland vegetation community has been compromised.

Wetlands and Riparian Areas Objective 6

Within 15 years, begin or continue management of fee-title wetland vegetation so that at least 80 percent of wetlands are in good vegetative condition across the refuge complex, as defined by the MNHP Wetland Condition Assessment method.

Strategies

- For wetlands without water management capabilities, manage wetland vegetation by using grazing, haying, or fire to emulate historical disturbances when natural flooding and drying cycles allow.
- On Benton Lake Refuge, manage wetland vegetation using grazing, haying, or fire to emulate historical disturbances in conjunction with flooding and drying cycles to improve native vegetation composition.
- Reduce the competition and cover of nonnative vegetation by using discing, prescribed fire, grazing, haying, or herbicides. Priority will be given to invasive species management within wetlands using IPM and EDRR.
- Where proper and feasible, native plantings and seeding may be used to restore native vegetation.
- Monitor vegetation to determine if wetland vegetation is improving or declining.
- Identify and monitor key wildlife species as added indicators of wetland health and management success.

Rationale. Vegetation is a common indicator of wetland health (Fennessy et al. 2007). Many methods have been developed to try to capture this, but the methods of DeKeyser et al. (2003, 2009), Hargiss et al. (2008), and the MNHP (2010b) have been developed on similar wetland basins and capture the range of variation within the refuge complex. The method is also flexible, allowing for rapid assessments in areas where change is expected to be minimal or the Service's ability to affect the wetland with management is minimal, but can be scaled up to a more intensive method where active restoration, changes in management, or significant effects from the surrounding landscape would be expected.

Objectively determining the breakpoints, or thresholds, for condition classes, such as defining what is a "good" wetland is difficult. The MNHP is currently working on a wetland reference network in Montana that will help clarify this definition. Until this is finished, the Service will use the vegetation metrics identified by the MNHP and strive to have wetlands in the top condition classes for each metric. At a minimum, the Service will conduct the rapid assessment and strive for at least 80-percent cover by native plants, less than 5-percent noxious weeds, less than 25-percent other nonnative or highly tolerant native species, moderate litter accumulation that does not prevent plant recruitment, and no single dominant plant type across entire wetland. In wetlands with naturally occurring woody vegetation, all age classes of native woody vegetation are present and less than 50 percent of available second-year-and-older stems are browsed. Reference conditions and cutoff values for "good" conditions classes may be reassessed after the initial evaluation.

For wetlands with active restoration or management such as Benton Lake Refuge, a more intensive assessment can be conducted that collects more details on the diversity of native plant species and their Coefficient of Conservatism and Overall Floristic Quality Index (Northern Great Plains Floristic Quality Assessment Panel 2001; MNHP unpublished data on file at the refuge). This information will be fed into the overall ARM approach for the refuge to provide feedback on management successes. Wildlife response to changes in wetland vegetation will also be considered in the ARM framework for Benton Lake Refuge. For example, understanding the impact of changes in native wetland vegetation to sustainable populations of wetland-dependent migratory birds will be important for defining a "good" wetland.

Wetland vegetation will be managed to mimic historical disturbances and support sustainability and resiliency in concert with flooding and drying. For example, prescribed fire; mowing; or certain herbicide applications to consume litter, rejuvenate vegetation, or control exotic species may only be possible when wetland basins are sufficiently dry. Reducing or eliminating nonnative invasive wetland vegetation using IPM and EDRR will be done to improve habitat for wetland-dependent wildlife. Native wildlife has evolved to use native vegetation for feeding, nesting and hiding cover. Nonnative vegetation is often a poor substitute, potentially reducing the ability of wildlife to successfully breed and build up energy reserves for migration. Herbicide treatments for wetland vegetation carry inherent risks for potential contamination and nontarget effects. These need to be carefully weighed against the potential benefits.

Forests and Woodlands Objective 1

In collaboration with the BLM's Marcum Mountain Resource Management Projects (BLM 2010), the Service will develop site-specific prescriptions to reduce average conifer canopy coverage by 50–75 percent through emulation of a mixed severity fire in natural patterns, consistent with Douglas-fir habitat types within Fire Groups 4 and 6 (Fischer and Brady 1987).

Strategies

- Treat 260 acres of warm Douglas-fir forest habitat on the Blackfoot WPA using timber harvest, mastication, and prescribed fire, or a combination of these treatments.
- Restore historical wildlife habitat attributes, such as snags, large down logs, and quantity and quality of forage and browse species, while keeping open, large-tree (more than 18 inches diameter at breast height) habitat with edge sinuosity and feathered density transitions.
- Support visual resources within the various forest types.
- Increase the landscape's resilience to future wildfire events, root disease and mountain pine beetle outbreaks by supporting and increasing (depending on location), the widely adapted seral species present (such as ponderosa pine and quaking aspen).
- Reduce invasive plant species within these forest types.

Rationale. Harvest, mastication, and prescribed fire treatments will be designed to decrease conifer encroachment into open parks and meadows, increase aspen groves by decreasing conifer encroachment

and stocking density to more historical levels, decrease ladder fuel on ponderosa pine-dominant sites, and reduce any remaining hazardous fuel.

Treatment activities are intended to support and restore forest and rangeland health by improving vegetation distribution (spatial and temporal) and species composition and structure to resemble the historical range of natural variability.

The quaking aspen and shrub–grass parks have tended to decrease in extent and habitat quality because of long-term fire suppression, conifer competition, timber management activities, browse damage by wild ungulates and livestock, and past livestock management practices.

Some proposed vegetation treatment units are located within sight of Highway 200. Treatments in these units will be implemented in such a way as to not dominate the visual landscape.

- *Fire Group Four*: Warm, dry Douglas-fir habitat types. Under natural conditions, these sites support fire supported ponderosa pine stands. In the absence of fire, Douglas-fir regenerates beneath the pine and eventually dominates the overstory.

- *Fire Group Six*: Moist Douglas-fir habitat types. Douglas-fir often dominates all stages of succession on these sites, even when subjected to periodic fire.

Forests and Woodlands Objective 2

Within 2 years of plan approval, determine if forestland treatments are needed on the remainder of the refuge complex. If needed, develop management plans with site specific prescriptions.

Strategies

- Use natural fire regimes according to "Fire Ecology of Western Montana Forest Habitat Types" (Fischer, 1987) to support the health and vigor of forested resources. Natural fire regimes will be emulated with prescribed fire, which may require some thinning or fuel reduction before prescribed fire.

Rationale. In general, complex forest lands are in good condition and do not need extensive management at this time. Since forest comprise only 3 percent of refuge complex lands and are naturally self-sustaining for decades, complex resources have been directed to other habitats. All complex forest lands are surrounded by vast acres of forest managed by the USDA Forest Service, Montana Department of State lands and Plum Creek Timberlands. Timber management of these mid-elevation forests is primarily for sustainable harvest and multiple uses. Managing refuge lands for mature forests will complement adjacent forest types.

Sagebrush-Steppe Objective

Manage 2,500 acres of healthy, vigorous sagebrush-steppe habitats dominated (more than 50-percent cover) by mid-height, native cool-season grasses, at least 13-percent mountain big sagebrush cover with an average canopy height less than 5 feet, and Ponderosa pine, Douglas-fir and Rocky Mountain Juniper at less-than-5-percent cover. Annually, these conditions should be supported on at least 50 percent of grassland and steppe habitats as nesting cover for upland nesting waterfowl and sagebrush-dependent species.

Strategies

- When conditions are conducive, prescribed fire may be applied to the native sagebrush uplands emulating the historical mean fire interval for big sagebrush communities in southwestern Montana, which is estimated to be 25 years (Lesica et al. 2005).

- If prescribed fire is not fully successful in reducing the woody vegetation cover to less than 5 percent, mechanical removal of trees may be needed to meet objective.

- Units of sagebrush-steppe will be grazed at a high intensity (50–60 percent removal of standing cover), with a heavy stocking rate, for a short duration, as needed to reduce litter and increase vigor of the grassland understory.

- Priority will be given to invasive species management within sagebrush-steppe using IPM and EDRR.

- Monitor species composition and vegetative trends to evaluate the success of current management regimes.

Rationale. Native sagebrush-steppe is an imperiled ecosystem, with as much as 60 percent of the sagebrush communities in North America considered to be significantly altered or degraded (Knick et al. 2003). There is a priority to protect this vital habitat type through conservation easements and work with private landowners through the Partners for Fish and Wildlife Program to improve management on these lands. The Service also wants to manage its fee-title sagebrush-steppe to best complement the native species that rely on this habitat type.

Woody species such as Ponderosa pine and Rocky Mountain juniper are encroaching into the native sagebrush uplands and significant ecological changes are occurring. This invasion is taking place because fire has been excluded from the valley floor and it will continue until fire is reentered into the natural equation or until mechanical and chemical techniques are used (Miller and Rose 1999, Miller et al. 2001). Historical mean fire intervals for big sage communities were estimated at 25 years for southwestern Montana (Lesica et al. 2005).

Prescribed fire can be logistically and socially difficult to complete. When certain situations present themselves, such as landowner interest, partner availability, and the ability to safely complete burns, prescribed fire will be considered to meet various habitat objectives. However, no more than 50 percent of the native uplands in a single unit will be burned during the breeding season each year. If it is not fully successful in reducing the woody vegetation cover to less than 5 percent, mechanical removal of trees may be needed to meet the objective.

The understory of the sagebrush-steppe is typically dominated by rough fescue, ranging in canopy cover from 10 percent to as much as 70 to 80 percent on the least disturbed, most mesic sites. Other important understory (more than 75 percent) grasses are Idaho fescue, prairie Junegrass, and bluebunch wheatgrass (Cooper 2004). Rough fescue plants appear to be well adapted to periodic burning, however, succession to a near-climax state takes more than 20 years following heavy grazing, and complete recovery following light grazing can take up to 14 years (Tirmenstein 2000). Conversely, Idaho fescue can increase with grazing and can become dominant when rough fescue is overgrazed. If prescribed fire is not possible on sagebrush-steppe habitats, litter may build up and decrease the vigor of the understory grasses. In such cases, limited grazing may be helpful, but no more than 25 percent of the total native upland acreage will be grazed in any one year. Grazing prescriptions will need to be carefully monitored to avoid adverse effects.

Plants such as spotted knapweed, yellow toadflax, common tansy, and Canada thistle have the genetic propensity to invade native vegetation and become a dominant element of the landscape, often with only minimal disturbance or through natural disturbance events. These species degrade wildlife habitat, increase soil erosion, diminish water quality, degrade native grasslands, and require the expenditure of significant resources in attempts to control their spread. None of these species are native to Montana, and most of the natural agents (insects and diseases) that keep these species under control in their native areas of Europe of Asia are not present in Montana and there is no other natural agent to prevent the unchecked spread of these species across the State.

On the Service's fee-title lands, the local refuge manager and the Invasive Species Strike Team have mapped infestations and are actively managing these infestations through biocontrol, chemical control and monitoring. Integrated weed management strategies include herbicides, biocontrol, revegetation, multispecies grazing, hand pulling, plowing, mowing, prevention, and EDRR.

High-priority species such as the Brewer's sparrow, and loggerhead shrike build nests aboveground in shrubs or rely specifically on shrubs for cover. Brewer's sparrows, in particular, have experienced significant declines in the last 10–20 years and are good habitat indicator species because they appear to be sensitive to habitat changes at multiple scales (Knick et al. 2003). Brewer's sparrow is strongly associated with sagebrush, preferring sites with more than 13-percent sagebrush cover with an average canopy height less than 5 feet and more than 25 percent of cover in native, climax species (Bock and Bock 1987, Rotenberry et al. 1999).

Wildlife Goal

Support diverse and sustainable continental, regional, and local populations of migratory birds, native fish, species of concern, and other indigenous wildlife of the northern prairies and intermountain valleys of northern Montana.

Species of Concern Objective

Over the next 15 years, develop protocols to protect and enhance federally listed endangered, threatened, or candidate species on refuge fee-title lands for the continued health and viability of populations and reduce any possible negative effects from management actions on other State and Federal species of concern.

Strategies

- Develop protocols to evaluate the effects of new or changed management actions on species of concern.
- Develop a monitoring protocol to establish abundance, population trends and habitat associations of high-priority species of concern.
- Work with conservation organizations, MFWP, and private organizations to help with inventory and monitoring.

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Grizzly bear spotted in Blackfoot Valley Conservation Area.

- Coordinate with the MNHP to survey the Swan River Refuge yearly for water howellia.
- Survey suitable habitat on waterfowl production areas in the Blackfoot Valley for Spalding's catchfly.
- Continue to support Blackfoot Trumpeter Swan reintroduction by coordinating cygnet releases, release sites, and monitoring until seven breeding pairs are established or until evaluation by the working group under the guidance of the Blackfoot Trumpeter Swan Program Implementation and Evaluation Plan suggests that the project should be terminated.
- Consider reintroduction of trumpeter swans within the Swan Valley Conservation Area.
- Evaluate and potentially begin grizzly bear conflict reduction measures, as implemented in the Blackfoot River Conservation Area, in communities within the Rocky Mountain Front and Swan Valley Conservation Areas. Grizzly bear conflict reduction measures will only be implemented in concert with Montana Fish, Wildlife and Parks and with support from local communities.
- Evaluate the effects of public use on species of concern and carry out seasonal public-use restrictions in areas where species of concern occur within 5 years of plan approval.

Rationale. The ESA requires Federal agencies to carry out conservation (recovery) programs for listed species and to make sure that agency actions are not likely to jeopardize the continued existence of listed species or adversely change or destroy their critical habitat. Section 7(a) of the act requires Federal agencies to evaluate their actions with respect to any species that is listed as endangered or threatened and with respect to its critical habitat, if any is being designated.

Conservation planners often develop a list of species of concern specific to their goals and objectives. The refuge complex has decided to use the MNHP's list of species of concern because they are specific to areas managed by the refuge complex, and the criteria used to make up their list was based on population size, area of occupancy in Montana, short- and long-term trends, threats, inherent vulnerability, and specificity to environment. Species designated as State species of concern by the MNHP that may occur within the refuge complex are located in appendix G. Refuge biologists will look at the MNHP list, compare it to other programs' lists, and evaluate population trends and habitat needs to establish a hierarchy of species to consider in management decisions for the complex. Any management action that would result in long-term or substantial changes to habitat (including changes from historical management techniques) will be reviewed by refuge staff for effects on species of concern before implementation. In addition, staff will conduct pre- and post-monitoring of selected species in conjunction with habitat management efforts, including restoration, and regeneration efforts. Supporting an up-to-date list of species of concern, providing feedback on refuge complex occurrences to MNHP, and monitoring the effects of management actions will help support the conservation of species of concern on the refuge complex.

Spalding's catchfly is a federally listed threatened species that is easy to miss in traditional surveys and monitoring. Waterfowl production areas in the Blackfoot Valley contain habitats (rough fescue-dominated grasslands and fescue–sage grasslands) that support Spalding's catchfly in other locations. Although vegetation surveys have been conducted on these waterfowl production areas, intensive surveys for Spalding's catchfly also need to be conducted.

Water howellia is restricted in Montana to depressional wetlands in the Swan Valley, typically occupying small basins where the water level recedes partially or completely by the fall. Water howellia is located on land owned by TNC next to the Swan River Refuge. Similar habitat is found on the Swan River Refuge. Surveys need to be conducted in suitable habitat yearly because water howellia production is highly dynamic depending on yearly climatic conditions.

The NCDE grizzly bear population is increasing at an annual rate of 3 percent and the overall population is estimated at approximately 900 bears (Servheen et al. 2001). There were 232 mortalities

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Badger

documented between 2000 and 2010 with 49 percent of those deaths occurring on private lands. Research shows that these mortalities are a direct result of human–grizzly bear conflicts (Servheen et al. 2001). Successful, cooperative, conservation delivery activities that have been implemented in the Blackfoot Valley Conservation Area to reduce human–grizzly bear conflicts include the removal of dead livestock carcasses, protecting spring calving areas, and installing power fencing around apiaries (USFWS 2011f). Initiating similar cooperative efforts in the Rocky Mountain Front and Swan Valley CAs could result in further reductions in human–grizzly bear conflicts for the NCDE grizzly bear population.

Disturbance caused by recreational pursuits may elicit behavioral or physiological responses in wildlife. Behavior responses occur when individuals are displaced from prime foraging habitats. This may result in decreased body condition going into winter, which has been linked to lower reproductive performance and even death. Other behavior responses include flight and interference with foraging. Physiological responses are less obvious and harder to measure. They include adrenaline-induced increases in heart rate, blood flow to skeletal muscle, increased body temperature, and elevated blood sugar (Gabrielsen and Smith 1995), all of which exert an energy cost to the animal. By reviewing and summarizing known effects from disturbance on species of concern within the refuge complex, staff will be better able to manage and reduce possible negative effects.

Migratory Birds Objective

Throughout the life of the plan, the refuge complex will annually review national and regional migratory bird population trends and then address monitoring and management strategies as needed.

Strategies

- Increase communication and coordination with Division of Migratory Bird Management within the Service to identify species of conservation concern.

- Once a species of conservation concern is identified, seek Division of Migratory Bird Management input to provide potential management and research direction and opportunities for helping with long-term sustainability.

- Use adaptive management, such as implementation of seasonal closures on fee-title lands to protect nesting birds, limited predator removal, nest success monitoring and artificial nesting structure implementation to support habitat augmentation efforts for species of conservation concern, and cooperate with research efforts done by partner agencies.

- Annually take part in population level or landscape-level monitoring of migratory birds such as the North American Breeding Bird Survey, Annual Midwinter Waterfowl Survey, Prairie Pothole Breeding Waterfowl Survey (Four-square Mile Survey), Mourning Dove Survey, and preseason waterfowl banding for the refuge complex.

Rationale. Due to an ever-increasing habitat loss, migratory birds have become dependent on land managers for habitat creation, maintenance and health (Vickery et al. 2000). Landscape-level habitat and species management is the impetus as natural resource management moves into the future (USFWS 2009c). Contributions to this landscape-level effort done by the refuge complex will include the continuation of annual reviews for national and regional migratory bird trends through the following efforts:

- Partners in Flight

- U.S. Shorebird Conservation Plan

- North American Bird Conservation Initiative

- U.S. Conservation Joint Ventures Bird Habitat Joint Ventures—Prairie Habitat Joint Venture (Canada) and Prairie Pothole Joint Venture (United States)

Consultations with the Division of Migratory Bird Management within the Service may identify potentially imperiled species. When species are identified as being a species of conservation concern, management actions could be modified accordingly to support migratory bird objectives.

Population and landscape-level studies require an investment of staff time and money, though this varies greatly among studies. The most intensive studies currently are the Prairie Pothole Breeding Waterfowl Survey (Four-square Mile Survey) and preseason waterfowl banding. In general, population and landscape-level studies provide a good return on

investment because they do not need station-level staff to analyze data and interpret results, but the Service receives substantial management information from the resulting large datasets. However, broader studies may not provide site-specific information for managing a refuge or WPA.

Wildlife Disease Objective

Annually review national and regional disease trends and carry out monitoring and management strategies as needed.

Strategies

- Annually review and update the 2006 Disease Contingency Plan as needed.
- Conduct regular surveillance for key wildlife diseases such as highly pathogenic, botulism, chronic wasting disease, and West Nile virus.
- Consult with the regional Wildlife Health Program to carry on existing, or to adopt new, monitoring protocols.
- Support a supply of protective equipment for emergency cleanup and specimen collection operations.

Rationale. Because refuges are concentration spots for migratory birds and other wildlife, there is greater potential for disease outbreaks and mortality events. A Disease Contingency Plan specific to the Benton Lake Refuge was developed in 2006 and contains protocols for disease monitoring and management. Working with State and Federal agencies will be important in identifying disease concerns.

Cultural Resources Goal

Identify and evaluate the cultural resources of the refuge complex and protect those that are determined to be significant.

Cultural Resources Objective

Protect and preserve cultural resources throughout the refuge complex through coordination with the Region 6 Cultural Resources Branch, who help refuge staff with meeting the requirements of Section 106 of the National Historic Preservation Act and other cultural resources-related legislation.

Strategies

- Inform the R6 cultural resources staff of refuge complex projects early in the planning process by using the Cultural Resources Review Form.
- Known cultural resources will be documented by the cultural resources staff to figure out their proper, long-term management.
- Documented National Register eligible, or potentially eligible, resources and undocumented cultural resources, regardless if they have been evaluated for the National Register, will be protected from alteration or neglect.
- Conduct further investigation into the eligibility of two sites on the H2–O WPA for the National Register of Historic Places.

Rationale. The refuge complex has several documented cultural resources, however, much of its property has not been inventoried for these resources. Archaeological and historic sites are important to the Service and the public, and compliance with cultural resources-related legislation will serve to protect them. Federal laws and policies mandate the identification and evaluation of archaeological and historic sites on Federal lands. Specifically, section 106 of the National Historic Preservation Act requires all Federal agencies to consider cultural resources before project implementation and specifies the process required to meet this goal. Under the National Historic Preservation Act, cultural resources are treated as eligible for the National Register until they have been evaluated.

Archaeological surveys have covered about 470 acres at the H2–O WPA (Schwab 1994)revealing four prehistoric lithic scatters and two historic sites (McCormick ditch 24PW623 and McCormick farmstead 24PW618) that were found to be potentially eligible for the National Register of Historic Places and would need further investigation if work is proposed near them. The McCormick farmstead was found not eligible by the contractor, but the Montana State Historic Preservation Office did not concur. This unresolved eligibility is an ongoing issue.

Visitor Services Goal

Provide opportunities for visitors of all abilities to enjoy wildlife-dependent recreation on Service-owned lands and increase knowledge and appreciation for the refuge complex's ecological communities and the mission of the National Wildlife Refuge System.

Hunting Objective

Throughout the life of the plan, provide a variety of hunting opportunities for approximately 1,500 visits per year that support sustainable resources and provide participants with an opportunity to appreciate the natural environment across the complex.

Strategies

- Provide a variety of hunting opportunities across the refuge complex as shown in table 13.
- On the district, (excluding Sands and H2–O WPAs), evaluate conducting a hunting season for State-defined predators and nongame species from August 15 through March 1.
- Work with partners to develop programs to introduce young people to safe, effective, and ethical hunting techniques and methods.
- Coordinate with State and other interested groups to host a hunter education class at the refuge complex headquarters, which will include a mentored gamebird hunt.
- Encourage landowners of conservation easements to take part in the State block management program to increase hunter access.
- On Benton Lake Refuge, provide upland gamebird hunting according to State seasons from the opening of the waterfowl season (usually the first weekend of October) to November 30.
- On Benton Lake Refuge, provide waterfowl hunting as conditions allow from the start of the State season until November 30.
- On Benton Lake Refuge, provide youth waterfowl and upland gamebird hunting opportunities within State season.
- On Benton Lake Refuge, annually evaluate and, if needed, revise hunt location and seasonal availability to synchronize opportunity with water availability and to provide an inviolate sanctuary for migrating waterfowl.
- On Benton Lake Refuge, staff will strive to provide waterfowl hunting opportunity in 11 out of 15 years.
- For Benton Lake Refuge, conduct an annual open-house to inform the public about upcoming water management plans, restoration efforts, and monitoring results.

Rationale. In FY 2011, an estimated 1,847 visits for hunting occurred on the refuge complex representing 14 percent of recreational visits to the refuge complex. A variety of hunting opportunity exists throughout the refuge complex. Population goals for harvest are set by MFWP and flyway councils. All waterfowl production areas (except the Sands and H2–O WPAs, which were donated to the Service with the caveat of remaining nonhunting areas) are open to migratory bird, upland gamebird, and big game hunting in accordance with all State seasons. The Benton Lake and Swan River Refuges offer bird hunting only.

Hunting predators and nongame wildlife is currently prohibited on the refuge complex, however, on the district (excluding the Sands and H2–O WPAs), the potential for implementing a hunting season for State-defined predators and nongame species will be evaluated. Montana defines predators as coyotes, weasels, striped skunks, and civet cats

Table 13. Hunting opportunity throughout the Benton Lake National Wildlife Refuge Complex, Montana.

Animal group	*Benton Lake Refuge*[1]	*Benton Lake Wetland Management District*[2]	*Swan River Refuge*
Big game	No	Yes (mule deer, white-tailed deer, pronghorn, elk, moose, bighorn sheep, mountain goat, mountain lion, and black bear)	No
Upland gamebird	Yes (pheasant, gray partridge, and sharp-tailed grouse)	Yes (pheasant, gray partridge, sharp-tailed grouse, spruce grouse, ruffed grouse, Franklin's grouse, and turkey)	No
Migratory gamebird	Yes (ducks, geese, swans, and coots)	Yes (ducks, geese, swans, coots, common snipe, mourning dove, and sandhill crane)	Yes (ducks, geese, swans, and coots)
Predator	No	No[3]	No
Furbearer	No	No[3]	No
Nongame wildlife	No	No[3]	No

1Refuge hunting seasons vary from State regulations, see refuge specific regulations.
2Excludes Sands WPA and H2–O WPA, which were donated with condition of being a nonhunting unit.
3Trapping in accordance with State regulations is permitted on the district (with exception of Sands and H2–O WPAs).

USFWS

Cutthroat Trout

(spotted skunks). Nongame species are defined as badgers, raccoons, red foxes, hares, rabbits, ground squirrels, marmots, tree squirrels, porcupines, and prairie dogs. Allowing a predator and nongame hunting season from August 15 to March 1 will provide increased recreational opportunities to hunters while minimizing disturbance to migratory birds.

During years with adequate water from natural runoff or pumping on Benton Lake Refuge, the location of open and closed areas for waterfowl hunting and upland game bird hunting could change from year to year based on flooding and drying rotation of the management units.

Fishing Objective

Offer opportunities for fishing within the refuge complex while supporting sustainable resources.

Strategies

- On Swan River Refuge, allow fishing per State regulations on Swan Lake and Swan River. Boating access points are available on Swan Lake.
- On the Arod Lakes WPA, allow walk-in access year round and vehicle access to Middle and Round Lakes from January 2 to April 1.
- Prohibit minnow seining throughout the refuge complex.
- On the Benton Lake Pumphouse Unit, allow walk-in access to Muddy Creek for trout-fishing opportunities.

Rationale. As one of the six priority recreational uses identified in the Improvement Act, fishing provides traditional recreational activities on refuges and WPAs with no definable adverse effects on biological resources. Fishing is authorized throughout the refuge complex within designated times and areas, but only a few areas support recreational fisheries.

WPAs open to fishing include Arod Lakes and Blackfoot. In FY 2011, 425 fishing visits were reported for the refuge complex. Arod Lakes, with its plentiful yellow perch and northern pike, receives most of the fishing pressure in the refuge complex.

Wildlife Observation and Photography Objective

Provide opportunities for people of all abilities to observe wildlife (over 8,200 visits yearly) and for photography (over 500 visits yearly).

Strategies

- Make the public aware of opportunities throughout the refuge complex and identify open observation areas via signage, publications, and maps.
- Support and improve associated infrastructure associated across the refuge complex.
- Add associated infrastructure. Support seasonal closures (table 14) in some areas to protect sensitive wildlife values.
- Allow limited commercial photography through special use permit on a case-by-case basis.

- Provide year-round opportunities on waterfowl production areas throughout the district.
- Evaluate adding more walking trails throughout the refuge complex such as Bog Road on the Swan River Refuge.
- Collaborate with nongovernmental organizations to conduct birding tours and other opportunities for wildlife observation.
- Install a spotting scope to enhance viewing opportunities at the Swan River Refuge information kiosk and observation platform.
- Hire a park ranger (0.50 FTE, or one assigned half time to the refuge complex, half time to Benton Lake Refuge exclusively) to provide more opportunities and guided interpretive tours.
- On Benton Lake Refuge, continue to support observation and photography blinds.
- On Benton Lake Refuge, install another grouse observation and photography blind.
- On Benton Lake Refuge, continue to support an information kiosk and the Prairie Marsh boardwalk trail with a spotting scope.
- On Benton Lake Refuge, change or reroute the existing auto tour routes if habitat restoration efforts require it.
- On Benton Lake Refuge, restrict foot traffic, like hiking, snowshoeing, and cross-country skiing, to designated trails, roads open to motorized vehicles, and refuge hunt area during hunting season.
- For Benton Lake Refuge, provide a video in the visitor center that shows grouse dancing as an accessible alternative to the grouse blind and make visitors are aware that it is available. Explore putting the video on the refuge Web site.

Rationale. Wildlife observation and photography are among the six wildlife-dependent recreational activities listed in the Improvement Act. As such, they are considered priority public uses, although all recreational activities are secondary to, and must be compatible with, the primary purpose for which each refuge was established. Wildlife observation and photography provide recreational activities throughout the refuge complex with no definable adverse effects on the biological integrity or habitat sustainability of resources as defined in the act. In 2011, wildlife observation and photography accounted for 8,230 and 490 annual visits, respectively, to the refuge complex. A park ranger position will guide the resource complex to untapped resources, such as Great Falls, which could dramatically increase wildlife observation and photography visitation.

The opportunity to view and photograph a variety of species in their native habitats can be an exciting and rewarding experience. These encounters can enrich visitors' personal lives while garnering support for conserving the unique qualities and natural resources of the refuge complex for future generations.

In 2011, wildlife observation and photography at Benton Lake Refuge accounted for 7,650 visits. The Benton Lake Visitor Center, the Prairie Marsh Drive, Lower Marsh Road, an informational kiosk, the Prairie Marsh Boardwalk with a spotting scope, a photography blind, and a sharp-tailed grouse observation blind facilitate wildlife observation and photography opportunities on the refuge.

Table 14. Seasonal closures at the Benton Lake National Wildlife Refuge Complex, Montana.

Activity type	*Benton Lake Refuge*	*Benton Lake Wetland Management District*	*Swan River Refuge*
General	Rotating area closures due to changes in wetland and water management.	Arod Lakes WPA Road to Middle and Round Lakes closed to motorized vehicles April 1 to January 2.).	Closed to all public access except wildlife observation platform, kiosk, and non-motorized use of Bog Road.
Hiking	Permitted on roads that are open to motorized vehicles and designated trails.	Permitted on roads open to motorized vehicles.	Permitted on Bog Road year round.
Skiing and snowshoeing	Permitted from December 15 until the end of February.	Permitted as weather allows.	Permitted on Bog Road.
Equestrian use	By special use permit only.	Prohibited.	Prohibited.
Bicycling	Permitted on roads open to motorized vehicles and designated trails.	Permitted on roads open to motorized vehicles.	Permitted on Bog Road year round.
Boating	Nonmotorized boats permitted in the hunting area during hunting season only.	According to State regulations.	According to State regulations (no-wake zone).

Environmental Education and Interpretation Objective 1

During the life of the plan, expand environmental education programs for adults and children on and off the refuge complex, focusing on the wetland habitat and native prairie habitats and the natural, cultural, and historical resources of the refuge complex. Programs and activities will promote awareness of and advocacy for refuge resources and management activities for the more than 19,500 visitors and students annually.

Strategies

- Hire permanent 0.5 FTE park ranger to focus on environmental education, community outreach, public use, information dissemination, maintenance of public use infrastructure, programming and special events for the refuge complex.
- Develop more education kits specific to refuge programs and resources including field exploration kits (for example, backpacks with field equipment), a lending library and field activity pages.
- Develop a series of environmental outreach programs with specific themes as they relate to the particular complex unit, such as riparian restoration program for the Blackfoot Valley Conservation Area.
- Annually take part in at least two community events (such as the Envirothon) where the opportunity is available to educate the public about the refuge complex, its resources and the management activities.
- Provide onsite programs for school groups on the refuge complex.
- Conduct visits to local schools within the refuge complex to present information on the history, purposes, natural resources, management and the restoration project.
- Host events for the International Migratory Bird Day, National Wildlife Refuge Week, and National Trails Day.
- Pursue opportunities to expose middle school, high school, and college students to the field of natural resource management through job shadowing, internships, and other activities.
- Develop programs for introducing young people to the enjoyment of the outdoors and instilling ethical, safe, and effective skills for observation, identification, and photography of wildlife.
- Work with schools and teachers within the refuge complex to develop programs that support their curriculum objectives and facilitate a workshop for local teachers.
- Pursue grants and other money sources to support environmental education programs.
- Explore the possibility of a partnership with community colleges and universities to expand educational opportunity, volunteer activities, and internships.
- Use social networking tools to reach a greater part of the public including supporting and updating an accurate complex Web site, creating a Facebook page and Twitter account.
- Work with other organizations to place refuge information and directional maps at locations with high public traffic.
- Develop a refuge-specific traveling display that can be used for programs and events.
- Develop and install interpretive panels for the facilities throughout the refuge complex.
- Engage partners and challenge cost-share opportunities to develop a short refuge complex film accessible from the refuge complex Web site and used during outreach and educational activities.
- Utilize volunteers and the expertise of citizen scientists, such as members of local Audubon chapters, to assist with variety of monitoring, interpretive programming, brochure updates, and trail rerouting.
- Tailor interpretive and educational programming for Benton Lake Refuge to highlight grassland birds.
- Within 5 years, update existing literature, brochures, fliers, auto tour route brochure, Web sites, and other social media to adequately reflect the restoration and management efforts being conducted at Benton Lake Refuge.
- Develop a series of environmental outreach programs for Benton Lake Refuge with specific themes (such as prairie and wetland conservation) as it relates to the restoration process for the refuge.

- Design and install interpretive panels for Benton Lake Refuge that focus specifically on the restoration efforts and explain the restoration process and the progress.

- Adapt an environmental education curriculum for Benton Lake Refuge in coordination with the Great Falls Public Schools to reflect the changes throughout the habitat restoration process.

- When safety permits, allow visitors access to areas on Benton Lake Refuge undergoing restoration to highlight activities and restoration effects and resulting benefits to natural resources.

- Consider producing tear sheets on birdlife histories for Benton Lake Refuge.

- Develop a unified, professionally designed exhibit for Benton Lake Refuge with a central theme for the entire visitor center area.

- Provide outreach materials for people with disabilities visiting Benton Lake Refuge (large print, audio), and make sure that all refuge environmental education programs are accessible.

Rationale. Environmental education and interpretation are two of the six priority public-use activities listed in the Improvement Act. These are accommodated when compatible with the original purpose of the refuge unit. Environmental education within the Refuge System incorporates onsite, offsite, and distance-learning materials, activities, programs, and products that address the audience's course of study, refuge purposes, physical attributes, ecosystem dynamics, conservation strategies, and the Refuge System mission.

Environmental education is a process designed to teach citizens and visitors—children and adults—the history and importance of conservation and scientific knowledge about the Nation's natural resources. Through this process, the Service can help develop awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively toward the conservation of environmental resources. The refuge complex has been conducting minimal environmental education and interpretation activities due to limited staff. In FY 2011, the refuge complex staff reached 1,765 participants during on and offsite environmental education programs. Most of which, approximately 850, are third graders in the Great Falls Public School System who visit the Benton Lake Refuge as part of their education curriculum. In addition, refuge complex-wide, 525 participants attended 10 special events and 120 participants attended interpretation programs on- and offsite.

As restoration efforts proceed on Benton Lake Refuge, information will be readily shared with the public to articulate management expectations and results. Tailoring such interpretive messaging will increase the understanding of the Service's efforts to improve wetland health.

Environmental Education and Interpretation Objective 2

During the life of the plan, increase environmental and interpretive programs within the Blackfoot Valley and Swan Valley CAs.

Strategies

- Use a refuge wildlife specialist (1 FTE) at Upsata Lake to help the refuge park ranger provide and expand opportunities in the district, the Blackfoot Valley CA, the Swan Valley CA, and the Swan River Refuge.

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Deep Creek

- Use the facilities at Upsata Lake.
- Establish a cooperative program with the University of Montana at Missoula.
- Offer environmental education programs for youth groups, schools and the public within the Missoula area and the Swan Valley CA.

Rationale. More potential exists in the Blackfoot Valley and Swan Valley CAs to expand the Service's educational and interpretive efforts. Upsata Lake WPA, which is proposed for acquisition, offers an opportunity for more onsite environmental education and interpretive experiences with its proximity to Missoula and the University of Montana.

Administration Goal

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

Staff and Funding Objective

Strive to fill positions identified in the CCP as critical to accomplishing goals and objectives (table 15).

Strategies

- Conduct site visits and prepare briefing packages for Service and other Federal officials (for example, congressional staff) to showcase complex achievements and potential acquisition growth.
- Continue to accurately document funding and staff needs through memos and reports.
- Use local media throughout the refuge complex to promote habitat improvements, outreach activities, and other accomplishments.
- Continue to cultivate good working relationships with the refuge complex's neighbors, other State and Federal agencies, nongovernmental organizations and other user groups to promote grassroot support and advocacy for refuge complex initiatives.
- Cooperate with organizations like TNC and the Conservation Fund to leverage resources for conservation easement programs.
- Prove to neighbors, partners, and local communities the potential benefits of increased funding and staff in the refuge complex.
- Establish a Friends group to help support and advocate for the refuge complex.
- Coordinate and take part in multi-agency youth and volunteer programs and initiatives.
- Refine and increase participation in the refuge complex volunteer program.

Rationale. Increases in the size and complexity of lands within the refuge complex require added staff and money. Several new or expanded easement initiatives (Blackfoot Valley, Rocky Mountain Front, and Swan Valley CAs) will need more staff for monitoring and administering easements and more money to acquire easements.

Table 15. Current and proposed staff at Benton Lake National Wildlife Refuge Complex, Montana.

Refuge complex unit	*Current positions (FTE)*	*Proposed added positions*
Benton Lake and Swan River Refuges' headquarters	5.5	1 FTE full-time law enforcement officer, 1 FTE refuge complex park ranger, 1 FTE supervisory biologist refuge complex, 0.5 FTE generalist
Benton Lake Refuge	2	0.8 career-seasonal biological technician, 0.8 seasonal biological technician
Swan River Refuge	0	Supported by wildlife refuge specialist assigned to Swan Valley CA
Benton Lake Wetland Management District	1	1.0 maintenance worker
Blackfoot Valley CA	0.5	0.5 FTE wildlife refuge specialist
Rocky Mountain Front CA	1	0
Swan Valley CA	0	1 FTE wildlife refuge specialist

Current staff within the refuge complex consists of 9.5 permanent FTEs, and approximately 3 seasonal FTEs. Table 15 shows the current staff and proposed added staff required to fully carry out the CCP. Due to the area of responsibility and added complexities of this plan, all grade levels for current staff will be evaluated. If all positions are funded, the refuge complex staff will be able to carry out all aspects of this CCP, providing the greatest long-term help to wildlife, habitat, and ecosystems while improving facilities and providing visitor services. Projects that have adequate money and staff will receive priority for accomplishment. Staff and funding are requested for the 15-year life of this CCP.

Current staff and budget levels are not sufficient to complete required administrative functions. In FY 2009, the Refuge System received an increase of $250 million (National Wildlife Refuge Association 2009 Annual Report). Projections show that, due to the current state of the economy and increasing national debt and recession, operations funding levels should remain stable or decrease. With annual inflation, base allocations should erode with the inability to keep up with cost of living adjustments. The Service conservatively estimates a need for annual increases between $18 million and $35.5 million to meet conservation expectations of partners and the U.S. Congress (National Wildlife Refuge Association 2009 Annual Report). Increased operation funding is not expected.

However, a significant increase in LWCF appropriations for the Rocky Mountain Front Conservation Area has occurred in recent years. This money is highly variable and directly affects the refuge complex's ability to preserve intact landscapes.

To accomplish the goals and objectives identified in this plan, the refuge complex staff will need to maximize opportunities for in-kind help, both fiscal and human resources, in addition to experiencing increases in base (operations money) allocations. The refuge complex has a rich tradition of maximizing partnerships to meet established goals and objectives. The Service will need to continue these efforts and look for more opportunities to leverage dollars and human capital through partnerships. Creative work force planning, partnerships, and using supplemental money opportunities are mechanisms to successfully carry out recommendations. Other options are to use maintenance action teams, contracting, seasonal and temporary hires, volunteers, and youth initiatives.

Interest and concern for Benton Lake Refuge was expressed throughout the planning process. An opportunity to foster the Service's relationship with the local community of Great Falls will be possible with the formation of a refuge friends group. Friends groups serve as advocates and sounding boards for the local community. The friends group can be a conduit to share information and solicit support for the refuge regarding management actions, plans, and restoration efforts.

Facilities and Infrastructure Objective

Strive to support facilities and real property in good to excellent condition and meet Service standards and Refuge System goals.

Strategies

- Update the Refuge Lands Geographic Information System (RLGIS) database and assess condition assessment of existing infrastructure. Complete a rotational assessment every 5 years throughout the refuge complex.
- Support and improve facilities at Upsata Lake WPA.
- Remove any assets that are no longer contributing to the mission and goals of the refuge complex.
- Use annual maintenance funding for maintenance of real property assets.
- Use grazing cooperators for routine fence maintenance and pursue opportunities to use cooperators and volunteers for sign installation and replacement.
- Set priorities for replacement of water control structures based on age, availability of money, management needs, and condition assessments.
- Set priorities for road maintenance based on available funding and public use.
- Provide adequate facilities for employees and equipment.
- Improve and support existing accessible infrastructure and establish new facilities as needed.
- Increase staff by 1 FTE to address seasonal maintenance needs on the district.
- Replace faded logos on entrance signs and anywhere else they appear.
- Repair or replace damaged or faded boundary and informational signs, as needed, to meet Service sign standards.

- Develop a trapping plan for Swan River Refuge. Trapping will only occur by special use permit and for wildlife and infrastructure management purposes.

Rationale. Visitor services infrastructure including information kiosks, entrance, directional and boundary signing, trails, roads (public use and staff use only), water control structures, fences, dikes and buildings need routine annual and long-term maintenance to support resources in good to excellent condition.

Due to the extensive maintenance backlog in the Service and the lack of maintenance staff in the refuge complex (there is currently one full-time maintenance worker for the entire complex), infrastructure throughout the refuge complex varies from poor to excellent condition. Roads and dikes need gravel. In some areas, significant repair due to muskrat burrowing is needed. Some water control structures are failing due to advanced age and some sections of boundary fence no longer function effectively due to broken posts and wire. Signs are missing, unreadable and, in many cases, have been shot by vandals.

Recently, energy conservation modifications have been made at several facilities. There are more facilities in the refuge complex that need insulation, windows and roofs, and in some cases, siding.

Accessible facilities (such as restrooms and entrance ramps) exist primarily in refuge office buildings. Limited accessible facilities in the field include the Benton Lake boardwalk and hunt blind, and the Swan River observation platform and kiosk.

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Students from Centerville, Montana, identify birds at the visitor center at Benton Lake National Wildlife Refuge.

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 complex.

Visitor and Employee Safety Objective 1

Keep employee accidents and injuries (as reported to the Office of Workers Compensation Program) below the regional average of 6.2 hours of lost time per year.

Strategies

- Provide employees with proper personal protective equipment.
- Make sure all required safety and operator training is completed before engaging in tasks or work situations. Make sure other training, such as cardiopulmonary resuscitation (CPR) and first aid, is available to employees as needed or requested.
- Make sure employees review job hazard analyses before engaging in at-risk tasks.
- Practice sound risk management "the state in which risks are acceptable."
- Continue safety talks at weekly staff meetings.

Rationale. Injuries in the Service accounted for 21.1 days of lost time in FY 2010, second quarter (DOI 2010). Reducing the potential for accidents and injuries is cost efficient, provides better job satisfaction, and is the right way to conduct business. The Service requires job hazard analysis write-ups before all at-risk tasks, such as operating an all-terrain vehicle or pounding fence posts. A library of job hazard analyses is on the Regional Safety Office Web site.

Visitor and Employee Safety Objective 2

Over the life of the plan, strive to support the refuge complex as 100-percent visitor accident free.

Strategies

- Educate and inform visitors of their responsibilities while visiting national wildlife refuges and the ways to mitigate potential dangers and hazards.

- Use directional and informative signage, visitor information kiosks, and posted warnings to help reduce preventable accidents and mishaps.

- Close roads deemed unsafe for travel due to weather conditions or poor visibility.

- Law enforcement officers will help to protect visitors and report serious incidents to the proper authorities (per guidance found in 054 FW 1).

Rationale. Visiting a national wildlife refuge can be inherently dangerous. Snake bites, stinging and biting insects and their associated diseases, extreme hot and cold temperatures, wind, lightning, standing or turbulent water, uneven terrain, and steep edges can potentially turn a pleasant day out into a life-altering experience. The Service's role is to help identify these dangers, inform the public about them, and mitigate these dangers to the greatest extent possible.

Visitor and Employee Safety Objective 3

In the first 5 years, improve communication systems within the refuge complex.

Strategies

- During weekly program manager's meeting, share key safety issues between the multiple programs of the refuge complex.

- Provide staff with the best available communication tools (cell phones, satellite phones, radios) and upgrade them regularly.

- Routinely update the refuge complex's Web site to provide current conditions, information, safety hazards, and sightings of interest.

- Continue to coordinate with USDA Forest Service in the usage of their radio system including repeaters.

Rationale. Historically, vast areas of the refuge complex have been in communication dead zones, a situation that is complicated by the topography of the landscape. As cell and satellite usage increases, coverage has improved, however, many areas of the refuge complex continue to experience no service. Radios provide an essential means of communicating out in the field and to a base station, however, getting the proper authorizations to buy and program the best devices for the Service's needs has proven problematic over the last decade. A Memorandum of Understanding is in place with the Lewis and Clark National Forest office in Great Falls. Use of USDA Forest Service frequencies and repeaters has to some extent decreased the problem of communication dead zones, however, more efforts are needed.

Resource Protection Objective 1

Strive to support 100-percent compliance with easement contracts.

Strategies

- Follow the guidelines contained in the refuge easement manuals for enforcement procedures, conduct annual surveillance flights to detect or prevent potential easement violations and promptly follow up with needed enforcement actions.

- Make sure that there is conservation easement compliance by conducting annual meetings with individual landowners to review and discuss potential activities on their land as related to easement administration.

- Annually send letters and meet with new landowners to inform them of existing easements on their property, including associated easement provisions.

- Annually review Farmers Home Administration easements to make sure that all easement provisions are enforced.

- Review and update easement administrative manuals as needed.

Rationale. Monitoring and enforcing easement contracts is a critical aspect of protecting wetland and grassland habitats. Efforts to protect the habitat resources on easements will also be focused on preventative law enforcement. Proactively contacting landowners and operators may serve to remind them of easement provisions and hopefully prevent future violations.

Resource Protection Objective 2

Strive to limit illegal activity to at, or below, levels to be figured out within 5 years of plan approval.

Strategies

- Conduct regular law enforcement patrol of refuges and waterfowl production areas to make sure that there is compliance with regulations.

- Continue to foster good relationships with local, State and Federal law enforcement agencies.
- Make sure that there is adequate law enforcement coverage during peak activity by working cooperatively with officers from other refuges.
- Edit hunting regulations and general activities brochures to improve clarity and understanding of refuge specific regulations.
- Support proper signage to reduce visitor confusion and improve clarity of boundaries and restricted areas.
- Make sure that refuge regulation pamphlets are available for the public visiting outside of normal office hours.
- Develop baseline data using known current violations and set a measurable goal to reduce future violations.
- Hire a (1 FTE) full-time law enforcement officer assigned to the refuge complex and support at least one dual-function law enforcement officer (1 FTE) on the district.
- At the Swan River Refuge, close Bog Road to motorized vehicles west of the kiosk parking lot.
- Carry out seasonal closures throughout the refuge complex to protect sensitive wildlife values.
- At Benton Lake Refuge, increase patrol and preventative law enforcement efforts through the full-time law enforcement officer hired for the refuge complex.
- At Benton Lake Refuge, organize and distribute information about the changing routes of travel, access areas, designated closures, and changes in refuge-specific regulations that will improve preventative law enforcement efforts.
- At Benton Lake Refuge, submit news releases to local newspapers and radio stations and post on the refuge Web site to increase the public's awareness about annual recreational opportunities, refuge-specific regulations, and shifts in open and closed areas to hunting and other wildlife-dependent recreational uses.
- At Benton Lake Refuge, host an annual hunter orientation "open house" before the hunting season to share refuge-specific regulations and changes to the open and closed areas.

Rationale. Resources to be protected throughout the refuge complex include natural (wildlife and habitat) resources, cultural resources, facilities, and other government property. Law enforcement efforts will be focused on preventative enforcement. It is expected that, initially, the number of documented violations will increase due to increased law enforcement presence. As visitors become more aware of refuge complex regulations or have contact with law enforcement officers, the number of violations should decrease.

There is currently one dual-function Refuge Officer at the refuge complex. This officer spends between 25 and 50 percent of their duty hours conducting law enforcement activities including regular patrols and investigations to make sure that there is resource protection. The Montana–Wyoming Zone Officer, is stationed at the Benton Lake Refuge, and may provide more law enforcement support as time allows. Staff will continue to provide visitor, employee and resource protection at current levels even though LE presence has diminished from three dual-function law enforcement officers in 2004 to one dual-function officer in 2011.

Past violations on fee title lands, enforced with Violation Notices, have primarily been hunting violations. Problems of vandalism, trespass issues, dumping, and general littering exist, but violators are often not apprehended by law enforcement.

At this time, there is insufficient data to determine a measurable goal for reducing violations on fee title lands. It is expected that as law enforcement effort increases, the amount of documented incidents should increase because as officers spend more time and effort in the field, they become more aware of incidents and issue more violation notices. In time, the initial increase in the number of documented incidents should level off and decline as the local community and visiting public becomes more aware and compliant with regulations.

On the Swan River Refuge, Bog Road was once believed to be a county road; this four-wheel drive road has a history of being used for motorized recreation. The Service's recent investigation into this issue revealed that this is not a county road. On conclusion of this issue, the road will be gated to prevent unauthorized vehicle travel and may be opened as an interpretive trail.

Seasonal closures (table 14) will be implemented throughout the refuge complex to protect sensitive wildlife resources. Minimizing disturbance to nesting migratory birds is of particular concern.

At Benton Lake Refuge, law enforcement support on the refuge will consist of help from the collateral duty officer assigned to the wetland management district or the Montana–Wyoming Zone Officer stationed at the complex headquarters.

Restoration efforts within the wetland basin may require shifts in open and closed areas, auto tour routes, walking trails and other wildlife-dependent recreational activities. Preventative law enforcement efforts will help end or reduce the occurrence of refuge-specific violations. Open houses, news releases, posting of regulatory information will improve visitor compliance.

4.2 Stepdown Management Plans

The CCP is intended as a broad umbrella plan that provides general concepts and specific wildlife, habitat, visitor services, and partnership objectives over the next 15 years. The purpose of the stepdown management plans is to provide detail to managers and employees for implementing specific actions and strategies authorized by the CCP. Planned stepdown plans include the following:

- habitat management plan
- inventory and monitoring plan
- integrated pest management plan
- fire management plan
- visitor services plan
- law enforcement plan

4.3 Plan Amendment and Revision

This CCP will be reviewed annually to decide if it needs revision. A revision will occur when significant information becomes available, such as a change in ecological conditions. 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. Revisions to the CCP and the stepdown management plans will be subject to public review and NEPA compliance. At a minimum, this plan will be evaluated every 5 years and revised after 15 years.

USFWS

This boardwalk is part of the infrastructure available for visitor use at Benton Lake National Wildlife Refuge.