

CHAPTER 6—Management Direction



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Swan Valley Conservation Area.

This chapter contains the specific objectives and strategies that would be used to carry out the Service's proposed action (alternative C), which is the draft CCP for the Benton Lake National Wildlife Refuge Complex in northwestern Montana. The Service recommends this as the alternative that could best achieve the refuge complex's purposes, vision, and goals while helping to fulfill the Refuge System mission.

The proposed action (alternative C) would apply to all units of the refuge complex. If the Regional Director selects alternative C as the preferred alternative, the objectives and strategies presented in this chapter would become the final plan to be carried out over the next 15 years. In addition, the stepdown management plans listed in table 29 (refer to section 6.3 below) would provide implementation details for specific refuge programs. Alternative C would be augmented by specific objectives and strat-

egies for the Benton Lake Refuge, which are fully described in chapter 7 under alternative C1.

The focus of the draft CCP, as described in alternative C, acknowledges the importance of naturally functioning ecological communities in the refuge complex. Management efforts would be focused on restoring and supporting the natural dynamics of the ecosystems of the northern Great Plains and Rocky Mountains and providing associated visitor services.

Appendix E contains the required compatibility determinations (draft) for public uses and management actions associated with this draft CCP. In addition, appendix F describes the fire management program for the refuge complex.

6.1 Proposed 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 would carry out the actions in the objectives and strategies. The rationale for each objective provides context such as background information, assumptions, and technical details.

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 would 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 would 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 14) (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.

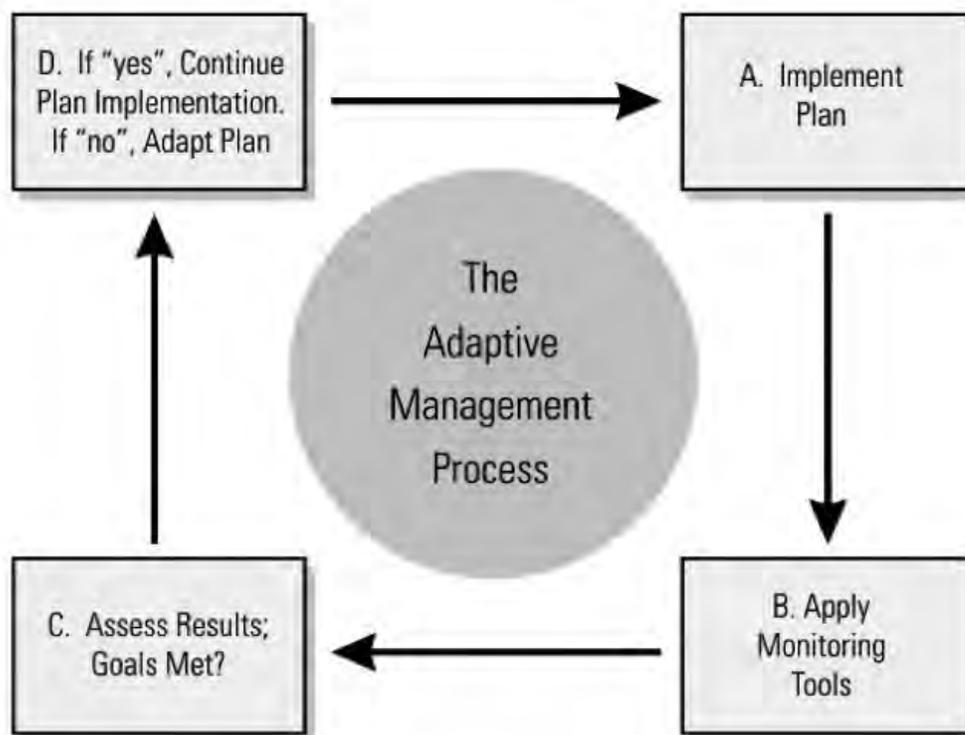


Figure 14. The adaptive resource management process..

- 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 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, would 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 would 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.

Climate Change Objective 1

Carry out at least five management actions in the next 10 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.
- Vigorously take part in all aspects of the Great Northern LCC and the Plains and Prairie Pot-holes LCC.
- Conduct baseline monitoring of habitat conditions to measure effects of climate change.
- Watch and analyze management actions to figure out the effect of climate change, including actively participating and cooperating in data acquisition through the national inventory and monitoring program.
- Support existing weather station and river gauges throughout complex, and install more stations and gauges to check climate change.
- Partner with USGS and others to obtain information on climate change and its applicability to management of the complex.
- Restore native grasses and perennial plants in grassland habitats throughout the refuge complex (see grasslands objectives).
- Actively support USDA NRCS conservation programs, such as CRP, in refuge complex watersheds.

Rationale. Climate change is contributing to the loss, degradation, and fragmentation of current habitats and would likely create unique new habitats as species redistribute themselves across the landscape. In addition, climate change is interacting with non-climate 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, would 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 and vigorous participation by complex staff, this recurring feedback process would 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 expanding these monitoring stations within the refuge complex, staff would have a better understanding of how global changes are translating to local effects. Developing baseline information and monitoring for habitat indicators would also be critical for understanding how climate change is affecting these resources as well as giving direction to future management. Collaborating with others such as the USGS, LCCs, and the Service's Inventory and Monitoring Program would 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. CO₂ 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 was found that in natural ecosystems of perennial plants, annual biomass production belowground generally exceeds that aboveground. Root mass was greater at grazed sites in two-thirds of the studies, and when production was viewed at the whole plant level, grazing had no effect on plant production (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, 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, 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.
- Pursue money to buy easements in established conservation areas from congressional appropriations, private donations, partnerships with nongovernmental organizations and securing other non-Federal money sources.
- Host informational tours to share examples of successful conservation collaboration between the Service and partners.
- Fully carry out the Service’s SHC initiative, which would 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 at 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.

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 would 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. Within the Service, having Service 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 established Swan Valley CA and any future conservation areas, this level of partnership and commitment is likely to be necessary to be successful. In addition, 1.5 FTE are necessary to



USFWS

A wetland in the Rocky Mountain Front Conservation Area.

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 money 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 would 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 money sources 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 would be made through consensus based on biological values, willing sellers, money source 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 would 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 would 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 would be consistent with priorities in the eastern part of the greater area, based on

similar models 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.

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 health 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 (<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 would be given to invasive species management within native grasslands using IPM and EDRR.
- Watch species composition and vegetative trends to evaluate the success of current management regimes.
- Identify and check 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 (USDA–NRCS–MT. 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 (USDA–NRCS–MT. 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 (USDA–NRCS–MT. 2005).

Therefore, 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.

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 would not stop all invasive species introductions. EDRR efforts increase the likelihood that invasions would 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 800 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

- 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 check results.

Rationale. Replanting tame grass to native grasslands, with subsequent treatments of prescribed fire and grazing management, would emulate historical processes and gradually recover soil mycorrhizae, invertebrate diversity and symbiotic relationships. Once native grass species are reestablished, soil erosion potential should be negligible, with permanent plant cover breaking the cropping cycle required to support tame grass. Carbon sequestration and nutrient cycling would be significantly greater in the more floristically diverse community expected with native plantings.

Tame grass stands that were hayed are more likely to be burned or grazed once they are replanted to native prairie. 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 compatible with grazing and fire treatments. Factors taken into consideration to assure reasonable success of 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), tradition-

ally 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 in establishment, planting approximately 50 percent, or 800 acres, of the priority tame grass stands to native species is considered reasonable over the next 15 years. Monitoring these plantings would 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 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 (Duebber 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 (Duebber et 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.

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 would still be a priority. Emphasis would be given to species that have been identified by the State of Montana as noxious. EDRR efforts increase the likelihood that invasions would 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 25 miles of tree shrub plantings, starting with high-priority large native prairie tracts.

Strategies

- Remove up to 19 miles of nonnative tree plantings on the Benton Lake Refuge. Removal efforts would start with 3.5 miles of interior tree plantings that cause fragmentation of otherwise contiguous grassland blocks.
- Remove remaining nonnative tree plantings on waterfowl production areas in the wetland management district as a second priority.
- 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 19 mile figure represents nonnative tree plantings in or next to 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.

Tree plantings on waterfowl production areas within the district are a lower priority because they are exclusively in tame grass stands and do not fragment native prairie.

Forestry cutters are available within the region and maybe reserved for specific projects. The tree removal may be accomplished using existing Service staff in the fall and winter months, which would 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.

Note: 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, USDI 1998). The exact numerical value would 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.
- For wetlands and riparian areas already within the minimum hazard thresholds, check conditions every 5 years thereafter or as water conditions allow.
- For wetlands and riparian areas above the minimum hazard threshold, conduct proper onsite remediation to reduce contaminants.
- For complex wetlands and riparian areas above the minimum hazard threshold, work with neighboring landowners, watershed groups, nongovernmental organizations and other government agencies to reduce offsite contributions to contaminants whenever possible.

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 (USDI 1998). In addition, lead can be a concern when birds feed in hunted areas and ingest lead pellets.

For waterbodies on fee-title land managed by the Service, any contaminant at levels shown to cause reproductive impairment in wildlife are unacceptable. Information 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 right for defining the minimum threshold (for example, USDI 1998, Montana Department of Environmental Quality, and EPA) for a given waterbody.

Selenium is a serious problem on the Benton Lake Refuge. The refuge has a history of moderate to high hazard levels (Nimick et al. 1996, Zhang and Moore 1997, refuge unpublished data 2006). Selenium at these levels is sufficient to affect reproduction in sensitive species such as waterfowl. See chapter 7 for more details on addressing this objective for selenium on Benton Lake Refuge.

In 1995, a survey of contaminants from 10 sites within the district was conducted to find out 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 in the surrounding landscape.

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.

Wetlands and Riparian Areas Objective 2

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

Strategies

- Check water inputs on fee-title lands as necessary to protect water rights.
- Conduct a hydrogeomorphic assessment of the Swan River Refuge and evaluate other fee-title areas, which could greatly benefit from this type of intensive assessment.

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 the 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. Most of the alterations to these waterbodies have been done with the intention of maximizing use by migratory birds, in particular waterfowl. While these alterations may initially increase use by waterfowl, these conditions may either be difficult to sustain or may result in unintended negative consequences to the health and sustainability of the wetland or riparian systems. For example, repeated or deep flooding may result in lower wetland productivity such as decreased food sources (seeds, invertebrates) for waterbirds, changes in vegetation including favoring nonnative, aggressive

species, reducing flows or increasing temperatures that are detrimental to species such as native trout in streams or rivers used as water sources, and causing or exacerbating contamination of waterbodies (Murkin et al. 1997, Zhang and Moore 1997, Heitmeyer et al. 2009).

To understand the extent to which alterations are affecting wetland health and integrity, a process known as the HGM methodology 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 check and support water rights, both natural and supplemental, the refuge complex has the greatest flexibility of possible management actions for improving the health of wetlands or riparian areas once the hydrogeomorphic context is understood.

Several areas within the refuge complex have been identified as high priority for restoring hydrology and wetland function because of documented negative effects, feasibility of restoration, or connection to ongoing mitigation efforts. These include the Benton Lake and Swan River Refuges. A complete hydrogeomorphic assessment has been completed for the Benton Lake Refuge. For a detailed description of restoration at Benton Lake Refuge, see chapter 7. Whether or not other fee-title lands could benefit from an HGM analysis would also be evaluated.

Wetlands and Riparian Areas Objective 3

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

- At H2–O WPA, natural flow and runoff would be captured, and Blackfoot River flows would be occasionally diverted from April to September to prolong the spring, summer, and fall hydroperiod. If less than historical amounts of water are used, residual right may be leased to the State.
- At Blackfoot WPA, management of natural wetland basins would emulate natural processes. The drying cycle would 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.

Rationale. Some wetland and riparian areas within the refuge complex have been altered, but the ability to restore the hydrologic function is limited by legal obligations, such as wetlands created under mitigation agreements, limited by constraints in the surrounding landscape beyond the Service's management controls or lack of money. In these cases, the Service would manage these areas by emulating the natural flooding and drying cycles.

Wetlands and Riparian Areas Objective 4

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.
- Summarize the degree to which current vegetation indicates a decline in integrity of native vegetation and value to wetland-dependent wildlife in a report. 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 2010, Hansen et al. 1996, 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 would assess the degree to which the integrity of the native wetland vegetation community has been compromised.

Wetlands and Riparian Areas Objective 5

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



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Kingsbury Waterfowl Production Area.

Strategies

- Manage wetland vegetation by using grazing, haying, or fire to emulate historical disturbances when natural flooding and drying cycles allow.
- Reduce competition and cover of nonnative vegetation by using discing, prescribed fire, grazing, haying or herbicides.
- Where proper and feasible, native plantings and seeding may be used to restore native vegetation.
- Priority would be given to invasive species management within wetlands using IPM and EDRR.
- Use natural flooding and drying cycle to favor native vegetation and reduce nonnative vegetation where applicable.
- Check vegetation to find out if wetland vegetation is improving or declining.
- Identify and check 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 (2010) 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 would help clarify this definition. Until this is finished, the Service would 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 would 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, no single dominant plant type across entire wetland, and for 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. For wetlands with active restoration or management, the more intensive assessment can be implemented that collects more details on the diversity of native plant species, their Coefficient of Conservatism and overall Floristic Quality Index (Northern Great Plains Floristic Quality Assessment Panel 2001; Montana Natural Heritage Program unpublished data) Reference conditions and cutoff values of "good" may be reassessed after the initial evaluation.

Forests and Woodlands Objective 1

In collaboration with the BLM's Marcum Mountain Resource Management Projects (Environmental Assessment DOI-BLM-MT-B010-2009-0013-EA), the Service would 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, 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 wild-fire 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 weed species within these forest types.

Rationale. Harvest, mastication, and prescribed fire treatments would 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 would 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, find out 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 would 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 mul-

tiples uses. Managing refuge lands for mature forests would complement adjacent forest types.

Sagebrush–Steppe Objective

Support 2,500 acres of healthy, vigorous sagebrush-steppe habitats dominated (more than 50-percent cover) by mid-height, native cool-season grasses. Support at least 13-percent mountain big sagebrush cover with an average canopy height less than 5 feet. Support 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-obligate 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 would 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 would be given to invasive species management within sagebrush-steppe using IPM and EDRR.
- Check 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 would be considered to meet various habitat objectives. However, no more than 50 percent of the native uplands in a single unit would be burned during the breeding season each year. 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 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 would be grazed in any one year. Grazing prescriptions would 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 or Asia are not pres-

ent 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 of species of concern and reduce any possible negative effects from management actions on other State and Federal species of concern.

Strategies

- Biologists would develop protocols to evaluate the effects of new or changed management actions on species of concern.
- Biologists would develop a monitoring protocol to establish abundance, population trends and habitat associations of high-priority species of concern.

- Partner with conservation organizations, MFWP, Plum Creek Timber Company, and private organizations to help with inventory and monitoring.
- 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 help 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 would 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 D. Refuge biologists would look at the MNHP list, compare it to other programs' lists,



Badger.

USFWS

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) would be reviewed by refuge staff for effects on species of concern before implementation. In addition, staff would 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 would help support the conservation of species of concern on the refuge complex.

Habitat management practices are derived from a manager's past experience, knowledge collected over years of hands-on fieldwork, research trials, and communication with colleagues. However, habitat management is a complex science and results can be site specific and change through time. It is necessary to check the effect of management actions on priority species to make sure these actions are having the desired wildlife species response. Management techniques can be altered if the desired results are not met. This is the basis of adaptive resource management.

Specific actions to help species of concern that have already been implemented on the refuge complex include the following: (1) collaboration with the MNHP to check for water howellia on the Swan River Refuge; (2) reintroduction of trumpeter swans to the Blackfoot Valley; and (3) baseline monitoring of colonial-nesting waterbird species of concern.

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 depression 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 Northern Continental Divide Ecosystem (NCDE) grizzly bear population is increasing at an annual rate of 3 percent and the overall population is estimated at approximately 900 bears (Servheen 2011). There were 232 mortalities 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 2011). Successful, cooperative, conservation delivery activities that have been implemented in the Blackfoot Valley Conservation Area to reduce human/grizzly bear conflicts include 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 Conservation Areas could result in further reductions in human/grizzly bear conflicts for the NDCE grizzly bear population.

Disturbance caused by recreational pursuits may elicit behavioral or physiological responses in wildlife. Behavior responses are seen 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 forms of behavior responses include flight and interference with foraging. Physiological responses are less obvious and harder to measure. They include adrenalin-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 reducing vigor.

Because they are listed under the ESA and have been the subjects of considerable research, evidence of such effects is more readily available for grizzly bears than many other species of concern (Claar et al. 1999). Recreational activities can affect, directly or indirectly, the survival of grizzly bears. Grizzly bears can be directly taken in the defense of human life. Indirectly, recreationists can displace bears off quality habitat onto less desirable habitat. This may result in reduced reproduction by displaced bears, higher mortality rates due to food stress or lower security, and smaller bear populations due to reduced carrying capacity of remaining habitat (Servheen et



Grizzly bear spotted in Blackfoot Valley Conservation Area.

al. 2001). Another example includes nesting trumpeter swans that have been shown to be sensitive to human disturbance during the nesting season. Bird-watching, photography, research, and other activities in or near nesting areas may cause nest failure or cygnet loss by disturbing adults (Mitchell 1994). In Yellowstone National Park, human intrusion was the most significant known cause of egg failure in trumpeter nests (Banko 1960). By reviewing and summarizing known effects from disturbance on species of concern within the refuge complex, staff would be better able to manage and reduce the possible negative effects.

Migratory Birds Objective

Through the life of the plan, the refuge complex would 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 2009e). Contributions to this landscape-level effort done by the refuge complex would include continuation of the 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 would 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.

All participation in population and landscape-level studies requires an investment of staff time and money; however, this varies greatly between 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 waterfowl production area.

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 or adopt new monitoring protocols.
- Support a supply of protective equipment for emergency cleanup and specimen collection operations.

Rationale. Because refuges are a concentration spot 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 other State and Federal agencies will be important in identifying present and future wildlife 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 project planning with the Cultural Resources Review Form.

- Known, but not documented, cultural resources will be documented by the cultural resources staff to figure out the 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 would serve to protect these resources. 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.

About 470 acres of archaeological survey has been conducted at the H2-O WPA (Schwab 1994). Four prehistoric lithic scatters and two historic sites were found. The two historic sites (McCormick ditch 24PW623 and McCormick farmstead 24PW618) were found to be potentially eligible for the National Register of Historic Places and need further investigation if work is proposed near them. The McCormick farmstead was found to be not eligible by the contractor, but the Montana State Historic Preservation Office did not concur. The unresolved National Register eligibility of this site is an on-going issue for the complex.

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 1500 visits per year, that support sustainable resources and provide participants with an opportunity to appreciate the natural environment on the district and Swan River Refuge.

Note: Specific hunting objectives and strategies related to the Benton Lake Refuge are presented in chapter 7.

Strategies

- Provide a variety of hunting opportunities across the refuge complex as shown in table 26.
- On the district, (excluding Sands WPA and H2—O WPA), evaluate the potential for implementing 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 would include a mentored gamebird hunt.
- Encourage landowners of conservation easements to take part in the State block management program to increase hunter access.

Table 26. Hunting opportunity throughout the Benton Lake National Wildlife Refuge Complex, Montana.

<i>Animal group</i>	<i>Benton Lake Refuge†</i>	<i>The District*</i>	<i>Swan River Refuge</i>
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**	No
Furbearer	No	No**	No
Nongame wildlife	No	No**	No

*Excludes Sands WPA and H2-O WPA, which were donated with condition of being a nonhunting unit.

†Refuge hunting seasons vary from State regulations, see refuge specific regulations

**Trapping in accordance with State regulations is permitted on the district (with the exception of Sands and H2-O WPAs)

Rationale. Hunting is one of the six priority recreational uses identified in the Improvement Act. All recreational activities are secondary to the primary purpose for which the refuge unit was established and must be compatible. Hunting provides traditional recreational activities throughout the refuge complex and local areas with no definable adverse effects on the biological integrity or habitat sustainability of the refuge complex resources as defined in the act. Hunting cannot conflict with the purpose of the refuge complex units. Service policy states that no more than 40 percent of a national wildlife refuge may be open to migratory bird hunting. This restriction makes sure that habitat without disturbance is available for migrating birds, including waterfowl.

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. Refuges of the refuge complex are more restrictive such as the Benton Lake and Swan River Refuges, which offer bird hunting only.

Hunting predators and nongame wildlife is currently prohibited on the refuge complex; however on the district (excluding 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 (spotted skunks). Nongame species are defined as badgers,

raccoons, red foxes, hares, rabbits, ground squirrels, marmots, tree squirrels, porcupines, and prairie dogs. Restricting a predator and nongame hunting season to August 15 through March 1 would provide increased recreational opportunities to hunters while minimizing disturbance to migratory birds.

Fishing Objective

Continue to offer opportunities for fishing at the Swan River Refuge and waterfowl production areas within the refuge complex while supporting sustainable resources.

Strategies

- Swan River Refuge would continue to be closed to fishing via walk-in access from March 1 until July 15 to reduce disturbance to nesting migratory birds. Walk-in access for fishing opportunities on the river through the refuge would continue from July 16 until the end of February.
- On Swan River Refuge, navigable waters are open to fishing by boat year-round. Boating access points are available on Swan Lake.
- Walk-in access would continue year-round on the Arod Lakes WPA with vehicle access to Middle and Round Lakes permitted from January 2 to April 1.
- Minnow seining would continue to be prohibited throughout the refuge complex.



USFWS

Cutthroat trout.

Rationale. As one of the six priority recreational uses identified in the Improvement Act, fishing provides traditional recreational activities on refuges and waterfowl production areas in the refuge complex with no definable adverse effects on biological resources. Throughout the refuge complex, fishing is authorized within designated timeframes and locations; however, a limited number of areas in the refuge complex support recreational fisheries.

Waterfowl production areas open to fishing include Arod Lakes and Blackfoot. In FY 2011, 425 fishing visits were reported for the refuge complex. Arod Lakes WPA, where yellow perch and northern pike are plentiful, receives the bulk of fishing pressure in the refuge complex.

Wildlife Observation and Photography Objective

Throughout the life of the plan, continue to provide visitors of all abilities with opportunities to observe and photograph a variety of wildlife species.

Strategies

- Make sure the public is aware of wildlife observation and photography opportunities throughout the refuge complex and identify open observation areas to the public through signage, publications, and maps.
- Support and improve infrastructure associated with wildlife observation and photography across the refuge complex.
- Expand wildlife observation and photography opportunities by providing added infrastructure. Support seasonal closures (table 27) in some areas to protect sensitive wildlife values.
- Allow limited commercial photography through special use permit decided on a case-by-case basis.
- Install a spotting scope to enhancing viewing opportunities at the Swan River Refuge information kiosk and observation platform.
- Continue to provide year-round wildlife observation and photography opportunities on waterfowl production areas throughout the district.
- Evaluate the potential for 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 to the public for wildlife observation.
- Hire a park ranger position (0.50 FTE, or one person assigned half time to the refuge complex, half time to Benton Lake Refuge exclusively) to help provide more wildlife observation and photography opportunities along with guided interpretive tours.

Table 27. Seasonal closures at the Benton Lake National Wildlife Refuge Complex, Montana.

<i>Activity type</i>	<i>Benton Lake Refuge</i>	<i>The District</i>	<i>Swan River Refuge</i>
General	See chapter 7, section 7.18	Arod Lakes WPA Road to Middle and Round Lakes Closed to motorized vehicles April 1 through the end of upland game season (approximately January 2)	Entire refuge closed to all public access March 1–July 15 except wildlife observation platform, kiosk and Bog Road. South of Bog Road closed year-round
Hiking	Permitted on roads that are open to motorized vehicles and designated trails	Permitted on roads that are open to motorized vehicles.	Permitted on Bog Road year-round.
Skiing and snowshoeing	Permitted refuge-wide from the close of upland gamebird season (approximately January 1) through the end of February	Permitted as weather allows	Restricted to designated roads and trails.
Equestrian use	Permitted on roads that are open to motorized vehicles	Prohibited	Prohibited
Bicycling	Permitted on roads that are open to motorized vehicles and designated trails	Permitted on roads that are open to motorized vehicles	Permitted on Bog Road year-round.
Boating	Nonmotorized boats are permitted in the hunting area during hunting season only	According to State regulations	According to State regulations (no-wake zone)

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 the primary purpose for which each refuge unit was established and must be compatible. Wildlife observation and photography provide recreational activities throughout the refuge complex with no definable adverse effects on the biological integrity or habitat sustainability of the refuge complex 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 would allow focus on the untapped resources within the refuge complex 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 would enrich visitors' personal lives while garnering support for conserving the unique qualities and natural resources of the refuge complex for future generations.

Environmental Education and Interpretation Objective 1

During the life of the plan, enhance public knowledge and understanding of the restoration efforts and the progress being made. 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 natu-

ral, cultural, and historical resources of the refuge complex. Programs and activities would 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 Environthon) 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.

Rationale. Environmental education and interpretation are two of the six priority public-use activities listed in the Improvement Act. All recreational activities are secondary to the primary purpose in which the refuge was established, and must be com-

patible. These uses (hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education) receive special recognition by the Service and 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 a citizenry that has 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.

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 refuge wildlife specialist (1 FTE) at Upsata Lake to explore and help refuge park ranger with outreach and education opportunities within the district, Blackfoot Valley CA, Swan Valley CA, and the Swan River Refuge.
- Use the facilities at Upsata Lake for environmental education and interpretive programs.
- 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 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

Throughout the life of the plan, strive to fill positions identified in the CCP as critical to accomplishing goals and objectives (table 28).

Current staff within the refuge complex consists of 9.5 permanent FTEs, and approximately 3 seasonal FTEs. Table 28 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 would be evaluated. If all positions were funded, the refuge complex staff would 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 would receive priority for accomplishment. Staff and money are requested for the 15-year life of this CCP.

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.
- 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 grass-root support and advocacy for refuge complex initiatives.
- Cooperate with organizations like TNC and the Conservation Fund to leverage resources for conservation easement programs.
- Continue to accurately document money and staff needs through memos and reports.
- Prove to neighbors, partners, and local communities the potential benefits of increased money 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.

Table 28. Current and proposed staff at Benton Lake National Wildlife Refuge Complex, Montana.

<i>Refuge Complex Unit</i>	<i>Current Positions (FTE)</i>	<i>Proposed Added Positions</i>
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
The 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

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 Conservation Areas) would need more staff for monitoring and administration of easements as well as more money to acquire easements.

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 the increasing debt and recession, operations money would remain stable to decreasing. With annual inflation, base allocations would 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 money 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 would 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 would 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.

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, which is proposed for acquisition.
- Remove any assets that are no longer contributing to the mission and goals of the refuge complex.
- Use annual maintenance money 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 and management needs and condition assessments.
- Set priorities for road maintenance based on available money 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 1.0 FTEs 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.
- Continue to develop and install entrance signs on all waterfowl production areas.
- Develop a trapping plan for Swan River NWR. Trapping would occur by special use permit for wildlife and infrastructure management purposes only.

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.

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 reportable to the Office of Workers Compensation Program) below the regional average of 6.2 hours of lost time a 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 account for 21.1 days of lost time in FY 2010, second quarter (DOI 2010). Minimizing the potential for accidents and injuries is cost efficient, provides better job satisfaction for employees, 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 available 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 with protecting 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 would 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

Over the life of the plan, 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 other 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 (1.0 FTE) full-time law enforcement officer assigned to the refuge complex and support at least one dual-function law enforcement officer (1.0 FTE) on the district.
- At the Swan River Refuge, close Bog Road (a county-owned road) to motorized vehicles west of the kiosk parking lot.

- Carry out seasonal closures throughout the refuge complex to protect sensitive wildlife values.

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 would be focused on preventative enforcement. It is expected that initially, the number of documented violations would 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 would continue to provide visitor, em-

ployee 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, and work is progressing toward extinguishing the right-of-way reserved by the former landowner before purchase as a National Wildlife Refuge. 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 27) would be implemented throughout the refuge complex to protect sensitive wildlife resources. Minimizing disturbance to nesting migratory birds is of particular concern.

6.2 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. Table 29 presents the plans needed for the refuge complex by unit, their status, and the next revision date.



Jeff Van Tine

Deep Creek.

Table 29. Stepdown management plans for Benton Lake National Wildlife Refuge Complex, Montana.

<i>Plan</i>	<i>Completed Plan, Year Approved</i>	<i>New or Revised Plan, Completion Year</i>
Habitat Management Plan		
Inventory and Monitoring Plan		
Integrated Pest Management Plan		
Fire Management Plan		
Visitor Services Plan		
Law Enforcement Plan		

6.3 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.

