4 Management Direction

The management direction in this chapter is the heart of the CCP. It is the plan for meeting the purposes and vision for Lost Trail National Wildlife Refuge as described in chapter 1.

Twelve goals address the various aspects of the vision. Each goal is a descriptive, broad statement of desired future conditions that conveys a purpose, but does not define measurable units.

The management direction specifies measurable objectives for meeting each goal. An objective is a concise statement of what to achieve, how much to achieve, when and where to achieve it, and who is responsible to achieve it. Included are strategies—specific actions, tools, or techniques used to meet objectives.

Rationale for each objective describes the background, assumptions, and technical details so that the reader can understand how and why objectives and strategies were formulated.

Management direction is provided in the following sections.

- Riparian habitat
- Wetland habitat
- Grassland habitat
- Forest habitat
- Invasive plants
- Migratory birds
- Other wildlife
- Species of concern
- Cultural resources
- Public use
- Administration
- Partnerships
- Funding and staffing

St. Johnswort
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Note: Most measurements in the objectives are in United States measures. However, for meaning in the scientific community, some measurements are displayed in the metric system. The conversion table below will help readers who wish to understand values in United States measures.

Table 11. Measurement unit conversions

Metric Measure	*United States Measure*
1 millimeter (mm)	= 0.04 inch
1 centimeter (cm)	= 0.4 inch
1 decimeter (dm)	= 3.94 inches
1 meter (m)	= 39.4 inches
1 square centimeter	= 0.16 square inch

Appendix I (fire management) provides background information for management of wildland fire and prescribed fire in the refuge. It also provides guidelines for the formulation of a future step-down management plan for fire management in the refuge.

Dave Menke/USFWS

Lesser scaup are common nesters on the refuge.

Carrying out the management direction is expected to result in the following general results for Lost Trail National Wildlife Refuge.

The biological potential of native plants and wildlife is provided through restored and enhanced habitats.

Use by an informed public does not impede reaching the biological potential.

Staffing is minimal, and facilities are improved.

Partnerships accomplish habitat management and foster conservation.

Riparian Habitat

Stream channels and associated vegetation are addressed in the management direction for riparian habitat. Water control structures that affect the functioning of riparian habitat, as well as fish passage, are addressed.

Goal

Restore, enhance, and maintain a mixed deciduous and coniferous riparian habitat to support indigenous wildlife species and perpetuate the ecological integrity of the Fisher River watershed.

Riparian Habitat Objective 1

Maintain coordination and collaboration for restoration of the stream vegetation and stream meander on the WRP easement to the south end of Pleasant Valley Creek, and Meadow Creek after it flows west from the water control structure until it joins with Pleasant Valley Creek, by meeting with the NRCS annually.

Strategies

1. Study stream characteristics and the biological potential of Pleasant Valley Creek, in collaboration with NRCS; MFWP; and Trout Unlimited.
2. Monitor revegetation along Pleasant Valley Creek through vegetation classification every third year.
3. Conduct surveys for migratory birds, songbirds, amphibians, and vegetation before and after restoration efforts in refuge ponds and Pleasant Valley Creek, in collaboration with NRCS and volunteers.

Rationale

The NRCS purchased a wetland reserve easement from the MPC for the entire section of Pleasant Valley Creek on the refuge. The WRP project has the following goals that relate to the Pleasant Valley Creek habitat:

- Address habitat needs for a diversity of fish and wildlife with a priority for species most impacted by degraded condition, beaver, moose, and those of ESA concern such as bull trout, westslope cutthroat trout, and redband trout.
- Restore wetland hydrology and vegetation to historical conditions.
- Restore streams to historic channels and function, where feasible.
- Restore fisheries habitat and aid fish passage to tributary channels, where feasible.

The NRCS restoration plan includes only the south section of Pleasant Valley Creek, beginning at Lower Moose Pond area and flowing west out of the refuge. The restoration plan calls for stream sinuosity and streambank vegetation.

Lower Moose Pond is an artificial impoundment developed years ago when the refuge was a working cattle ranch. The dam has been breached; however, a functioning pond still exists. This pond provides waterfowl pair habitat and is one of the two locations on the refuge that has been documented as one of the largest reproductive sites for boreal toads in the Rocky Mountains.

The refuge would like to foster NRCS efforts for revegetation further north on the creek; maintain waterfowl, songbirds, and amphibian habitat; and work with the MFWP to monitor stream quality for native fisheries so as to not contribute to degradation of the Fisher River drainage.

Pleasant Valley Creek is a tributary of the Fisher River. Fisher River is an important focus area for native fish restoration for MFWP. Pleasant Valley Creek can contribute to the system as a non-fish-bearing tributary, and possibly as a native-fish-bearing tributary after restoration efforts.

Pleasant Valley Creek presently is a non-fish-bearing tributary of the Fisher River. Historically, it supported Columbia redband trout and westslope cutthroat trout, and drains into the waters of the Fisher River where bull trout are being restored. The Pleasant Valley Creek currently does not support westslope cutthroat, redband trout, or bull trout (Mabbot 1996, Hensler 2001). All three fish species are cold-water species. Water temperature is a critical component of habitat selection for native fish. Pleasant Valley Creek, with its control structures, has the following conditions and effects:

- limited fish movement
- decreased depth and increase water temperature due to ponding and channeling
- large sections of streambanks denuded of native vegetation, which has led to increased water temperatures
- siltation habitat problem

Much of western riparian habitat has been lost or degraded due to flood control, irrigation projects (Hendrickson and Kubly 1984), grazing (Bock 1993), logging, and housing development. This type of habitat is important to a diverse set of migratory birds. The north end of Pleasant Valley Creek is in relatively good condition and has been relatively undisturbed for approximately 10 years. Prior to that, some selective logging occurred. Preliminary bird surveys already suggest bird use by passerines such as song sparrows, and ruby-crowned and golden-crowned kinglets. Stream habitat on the refuge could provide additional habitat for migratory birds with minimal effort—restoration through a revegetation project.

Willow flycatchers breed in riparian habitat with a midstory of 6- to 7-foot alders or willows, interspersed with openings (Casey 2000). This area could be enhanced by planting alders, willow, and hawthorn. This additional stream vegetation will provide migratory bird habitat and foster a reduction in water temperature that will enhance the native fisheries and amphibians. Any future discussion of stream restoration efforts that include changing the ponds on Pleasant Valley Creek will need to evaluate the effects on waterfowl and songbirds.

The boreal toad is a candidate species in Colorado and Wyoming, but not listed in Montana. It was once

recorded much more frequently in Montana than the previously mentioned states. However, the extent of boreal toad populations in Montana is unknown due to limited monitoring efforts.

The USGS has been conducting surveys in Montana for the last few years (Hossack 2003). With more than 3,000 wetlands surveyed, boreal toads were found reproducing at only 3 percent of these sites, with a maximum of only 10 females at any one site. On the refuge, upwards of 40 breeding females have been found at Lower Moose Pond, and more than 200 breeding females have been found on the south side of Dahl Lake. The refuge has the largest known population, by far, for the Rocky Mountains.

The Pleasant Valley Creek restoration project will benefit native fish restoration as well. However, for fish restoration to succeed, efforts for fish passage will have to be evaluated and developed on parts of the creek off the refuge as well. A large portion of the off-refuge stream is the downstream section that also has a WRP easement, similar to the WRP easement on the refuge. Working with NRCS, MFWP, and private landowners could make this project a highlight of restoring native fish, as well as other members of the ecosystem such as calliope hummingbird, willow flycatcher, otter, beaver, and moose.

Restoration is always expensive. The refuge has had multiple entities requesting information about the restoration effort on Pleasant Valley Creek. Many of these potential partners have offered to provide funding and expertise, as well as help to find additional funding sources. The refuge will continue to work with these groups and liaison with NRCS regarding funding needs to produce a restoration effort that will contribute a quality conservation effort for riparian habitat, migratory birds, and native fish.

Riparian Habitat Objective 2

Inventory and evaluate willow, alder, and birch vegetation (20 acres) in the Dahl Lake wetlands within 5 years of CCP approval, to determine the potential to increase plant diversity and habitat for migratory songbirds.

Strategy

1. Review literature for water regimes and soil types required for willow, alder, and birch.

Rationale

Much of western riparian habitat has been lost or degraded due to flood control, irrigation projects (Hendrickson and Kubly 1984), grazing (Bock 1993), logging, and housing development. Riparian shrublands consist of tall shrubs such as alder, willow, birch, and dogwood. This habitat is important because it provides foraging and nesting habitat for a diverse set of migratory birds, including many priority species identified by the MPIF (e.g., willow flycatcher, gray catbird, warbling vireo, MacGillivray's warbler, and lazuli bunting).

As the Montana Bird Conservation Plan points out, this habitat is also used by common species such as song sparrows, which should respond quickly to restoration efforts. Such efforts and results could be highlighted in public outreach efforts to illustrate the concept of "keeping common birds common." (Casey 2000).

Cornell Lab of Ornithology/USFWS

Willow Flycatcher

Riparian Habitat Objective 3

Restore stream bank vegetation (willow, alder, and hawthorn) within a 20-foot buffer with 75 percent canopy cover, along 0.9 mile of Pleasant Valley Creek (north of breached water control structure) within 5 years of CCP approval, to enhance nesting and foraging habitat for migratory birds, and reduce water temperature for fish and amphibians.

Strategies

1. Review literature for water regimes and soil types required for willow, alder, and birch.
2. Revegetate the north section of Pleasant Valley Creek where alders have died and channel meander is being restored at Lower Moose Pond, in collaboration with NRCS.
3. Monitor stream temperature and siltation in Pleasant Valley Creek each summer after revegetation has occurred, in collaboration with MFWP.
4. Monitor revegetation along Pleasant Valley Creek through vegetation classification every third year.
5. Establish point counts in stream habitat to determine if revegetation along Pleasant Valley Creek enhances use by birds.
6. Document the response of boreal toads to revegetation and restoration of Pleasant Valley

Creek; continue the collaborative project with USGS's Amphibian and Reptile Monitoring Initiative.

Rationale

The riparian and aspen woodlands were heavily grazed in the past. This resulted in scattered, height-suppressed shrubs; a sparse, even-aged overstory of willow, alder, and aspen; and an herbaceous layer in some areas where invasive species have replaced native species. Aspen and woody, riparian shrubs have not been as easily recruited, resulting in structurally simple woodlands.

Grazing can result in degradation of resources, especially when combined with other impacts. If care is not exercised and range grasses are overgrazed, often they will be encroached on by invasive species.

Vigor must be returned to accomplish productivity needed to regain the native, climax community (i.e., native plants in their "correct" percent compositions). Rest from cattle grazing will allow managers to determine current grassland conditions (cover, height, and productivity).

Prescribed fire is one method of promoting quaking aspen, and keeping conifers from succeeding.

> "Burning increases soil pH and adds organic carbon and nutrient to the soil. However, fire will probably not rejuvenate the stand if quaking aspen biomass is so low that burning does not appreciably raise soil pH and nutrient levels. Sucker vigor will probably be low." (Howard 1996; Tirmenstein 1988)

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than 3,000 wetlands surveyed, boreal toads were found reproducing at only 3 percent of these sites, with a maximum of only 10 females at any one site. On the refuge, upwards of 40 breeding females have been found at Lower Moose Pond, and more than 200 breeding females have been found on the south side of Dahl Lake. The refuge has the largest known population, by far, for the Rocky Mountains.

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Riparian Habitat Objective 4

Evaluate three ponds, three water control structures, and three culverts along Pleasant Valley Creek within 5 years of CCP approval, to determine effects on stream quality (siltation and temperature) and downstream fisheries.

Strategies

1. Study stream characteristics and the biological potential of Pleasant Valley Creek, in collaboration with NRCS; MFWP; and Trout Unlimited.
2. Provide one full-time biologist to monitor fish recovery and populations.
3. Monitor stream temperature and siltation in Pleasant Valley Creek each summer after revegetation has occurred, in collaboration with MFWP.

Rationale

The NRCS purchased a wetland reserve easement from the MPC for the entire section of Pleasant Valley Creek on the refuge. The WRP project has the following goals that relate to the Pleasant Valley Creek habitat:

- Address habitat needs for a diversity of fish and wildlife with a priority for species most impacted by degraded condition, beaver, moose, and those of ESA concern such as bull trout, westslope cutthroat trout, and redband trout.
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Riparian Habitat Objective 5

Enhance the integrity of the Pleasant Valley Creek restoration project by working with NRCS; MFWP; and private landowners to make the full length of Pleasant Valley Creek on and off the refuge fish passage-friendly within 8 years of CCP approval.

Strategies

1. Study stream characteristics and the biological potential of Pleasant Valley Creek, in collaboration with NRCS; MFWP; and Trout Unlimited.
2. Determine viability of sport fish populations by evaluating species presence, potential for continued reproduction, population size capable of supporting expected fishing pressure, and recovery of absent species.
3. Remove fish barriers in Pleasant Valley Creek downstream from the refuge, in collaboration with NRCS and private landowners.
4. Determine how to minimize any negative effects (resulting from modifications to refuge portions of Pleasant Valley Creek) on native fisheries downstream in Fisher River, through collaboration with the MFWP and NRCS.
5. Provide one full-time biologist to monitor fish recovery and populations.
6. Monitor stream temperature and siltation in Pleasant Valley Creek each summer after

revegetation has occurred, in collaboration with MFWP.

7. Monitor revegetation along Pleasant Valley Creek through vegetation classification every third year.

Rationale

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It is unknown how long it will take the water regime to be restored. In addition, it is unknown how long it will be before native fish populations could be restored, or even if they could be restored to a level that could support quality sport fishing. Historically, the valley may never have had a viable fishery resource.

The cost, personnel, and time needed to restore the fisheries to a level that could support fishing may be large enough to make restoration within the period of this CCP (10–15 years) unrealistic or totally prohibitive. The restored hydrology may not support large enough populations of sport fish species for a quality fishing program. Until a restoration program moves forward and is successful, the objective of providing fishing opportunities cannot be implemented.

Riparian Habitat Objective 6

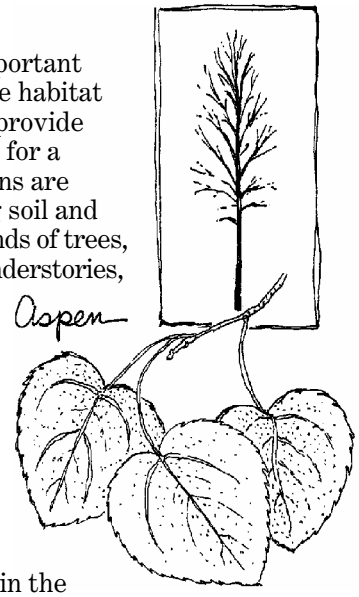
Maintain, and increase when feasible, quaking aspen acreage on the refuge in the Dahl Lake wetland complex (currently unit 12 [3 acres], unit 14 [23 acres], and unit 19 [24 acres]; see figure 5).

Strategies

1. Use prescribed fire in early spring, late summer, or fall (Howard 1996, Tirmenstein 1988) to promote quaking aspen for rejuvenation of existing stands or increase coverage of aspen.
2. Annually monitor vegetative response by measuring habitat coverage; map in the geographic information system (GIS).
3. Monitor for deteriorating stands as defined by low density of stems that are younger and smaller in size, and with poorer form and higher crown-to-stem ratios, than healthy stands (Schier and Campbell 1978).

Rationale

Aspen groves are an important component of the diverse habitat types of the refuge and provide food and nesting habitat for a variety of wildlife. Aspens are important for stabilizing soil and watersheds. Healthy stands of trees, shrub, and herbaceous understories, and the litter of aspen stands provide nearly 100 percent soil cover. Soil cover and the intermixture of herbaceous and woody roots protect soil, except during very intense rains (DeByle 1985b).



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A bald eagle has nested in the aspens on the north side of Dahl Lake for the last several years. Many migratory songbirds and woodpeckers use aspen for foraging and nesting habitat, especially moist aspen sites where avian species diversity tends to be higher than stands on dry sites (DeByle 1985a). Ruffed grouse use aspen communities extensively for an abundant and nutritious food source, as well as for courting, breeding, and nesting sites (DeByle 1985a). Young aspen provide browse for elk and deer, especially valuable during fall and winter, when protein levels are high relative to other browse species (Tew 1970), and for summer shade and thermal cover in winter. Moose use aspen in summer and winter (DeByle 1985a).

Monitoring of aspen stands will alert managers of when action is needed to maintain the stands. Prescribed fire is one method of promoting quaking aspen and keeping conifers from succeeding.

> "Burning increases soil pH and adds organic carbon and nutrient to the soil. However, fire will probably not rejuvenate the stand if quaking aspen biomass is so low that burning does not appreciably raise soil pH and nutrient levels. Sucker vigor will probably be low." (Howard 1996; Tirmenstein 1988).

Aspen regenerate from seed and by sprouting from the roots. Germination and seedling survival require a moist, mineral seedbed with adequate drainage, moderate temperature, and freedom from competition (McDonough 1979). Monitoring may be needed if it looks like ungulate overbrowsing is impacting regeneration efforts.

WETLAND HABITAT

Lakes, bogs, and other saturated wetland areas are addressed in the management direction for wetland habitat.

GOAL

Provide breeding, resting, and feeding habitat for wetland-dependent species of northwestern Montana by restoring, maintaining, and enhancing a mosaic of lake, semipermanent, seasonal, temporary, and saturated wetlands.

Wetland Habitat Objective 1

Recharge 100 percent of drained wetlands to 75–100 percent capacity within 5 years of CCP approval, to foster wetland recharge and promote wetland revegetation for wildlife habitat.

Strategies

1. Restore or increase water-holding capabilities in wetlands on the WRP easement, e.g., plug ditches, in coordination with the NRCS.
2. If runoff should not be adequate the first year for wetland refill of each restored basin, divert water for 1 year to initiate recharge of the basin.
3. Plug wetland drain ditches in the wetlands west of Dahl Lake within the west mitigative parcel.
4. Fill the drain ditch (Meadow Creek) coming out of the west end of Dahl Lake with off-site spoils that remain on-site, and by trucking in spoils to fill the ditch back west to the location of the old water control structure (figure 6).
5. Install a water control structure in the culvert near headquarters to allow water to fill the wetland to road height without washing out the road.
6. Monitor wetland-vegetation coverage response to recharge every third year; map in the GIS.
7. Annually conduct pair-count surveys for waterbirds to monitor use of wetlands pre- and post-refill.

Rationale

Many of the wetlands were drained in the interest of promoting hay pasture. The reduction of surface water and loss of wetland vegetation is not as conducive to waterfowl and other waterbird use. Many of the wetlands can be manipulated back to a basin that can discharge and recharge on a seasonal basis. One wetland (near office headquarters) does not need dirt work, just installation of a water control structure. Naturally occurring runoff should be adequate to fill wetland basins. However, water control structures will allow the maximum flexibility to manipulate water. As wetlands return to a normal seasonal fluctuation, wetland vegetation should reestablish without further manipulation.

These wetlands are classified as semipermanent and seasonal, which with recharge and time, should provide invertebrate foods and emergent vegetation for foraging habitat and nesting and brood cover.

Wetland Habitat Objective 2

Maintain wetland basins, other than the Dahl Lake complex, with a minimum 50:50 water-to-cover ratio well interspersed, within 5–10 years of CCP approval, to provide foraging and nesting habitat for waterbirds.

Strategies

1. Use rest, grazing, haying, and prescribed fire to maintain open water and remove decadent, residual, emergent vegetation with adaptive management.
2. Allow wetlands to recharge and discharge with naturally occurring seasonal fluctuations. Use no control structures to manipulate water depth.

Bernardo Garza/USFWS

Southeast Pond

Rationale

Wetlands with diverse emergent vegetation, interspersed seed-producing annuals, and open water with a submergent vegetation community provide the habitat requirements of many waterfowl and waterbird species (Cowardin et al. 1979). The refuge's primary purpose is for migratory birds, with emphasis on waterfowl and other waterbirds. Emergent vegetation (e.g., *Typha*, *Scirpus*, and *Juncus)* is critical to successfully raising a brood—from use as foraging habitat to escape cover. Submergent vegetation such as *Potamogeton*, *Mentha*, and *Equisetum* provides seeds and the substrate necessary for invertebrate populations to grow and provide food to waterfowl.

While there are some differences among waterfowl (such as mallards' preference for abundant emergent vegetation, while gadwall broods use more open water) the variety of wetlands should provide enough interspersion of open water to emergent vegetation to meet the needs of many species. Other

waterbirds such as black terns, American bitterns, and grebes, along with mammals such as moose and mink, will provide maximum opportunities for wildlife viewing and photography.

Wetland Habitat Objective 3

Restore Dahl Lake complex water levels to gain a minimum of 200 acres of temporary wetlands, and restore temporary wetlands (80 acres) to seasonal and semipermanent wetlands that fluctuate naturally (figure 6), within 5 years of CCP approval, to provide waterbird foraging and nesting habitat.

Strategies

1. Fill the drain ditch (Meadow Creek) coming out of the west end of Dahl Lake with off-site spoils that remain on-site, and by trucking in spoils to fill the ditch back west to the location of the old water control structure (figure 6).
2. Use rest, grazing, haying, and prescribed fire to maintain open water and remove decadent, residual, emergent vegetation with adaptive management.
3. Annually monitor vegetative response by measuring habitat coverage; map in the GIS.

Rationale

Dahl Lake is a natural lake that spills over to the west in high water years into the surrounding wetland complex. This complex is a system that naturally fluctuated in water level seasonally and yearly, creating an array of temporary, seasonal, and semipermanent wetlands.

The NWI data (1982) for the Dahl Lake complex designated the following:

- 182 acres of open water
- 80 acres of semipermanent wetlands (water through spring and summer and frequently into fall and winter)
- 432 acres of seasonal wetlands (water in spring and early summer but generally dry by late summer and early fall)
- 376 acres of temporary wetlands (water for only a few weeks after snowmelt and few days after heavy rainstorms)

Around 1940, the natural spillway was channelized and directed through a ditch system (named Meadow Creek) to reduce the lake to lower levels and dry the surrounding wet meadows to increase hay pasture. Meadow Creek extends westward through the valley from the western end of Dahl Lake. Portions of this creek were channelized and, more recently, dredged in an effort to increase water flow efficiency for irrigation. Historical and recent aerial photos show the area as a wetland complex of temporary and seasonal wetlands, with seepage and some overflow heading out of the west end of the complex and north across the county road before it turns back west. The Service will work closely with NRCS on restoration of the Meadow Creek area back to a wetland complex, since it continues west off of the east mitigative parcel onto the NRCS's wetland reserve easement.

Filling in the drain ditch out of the west end of Dahl Lake will affect the type of wetlands in the complex for seasonality (temporary and seasonal versus semipermanent) and amount of emergent vegetation. With the drain ditch filled in, the lake should fill to cover greater amounts of surface acreage and spill over to the west end to restore the wetland complex. The wetland complex will be able to fluctuate with natural variations in available water. There will be an increase of at least 200 acres of temporary wetlands. Water will be held longer to restore current temporary wetlands back to seasonal and semipermanent.

Water levels should increase gradually to avoid scouring turbidity and plant mortality (Weller 1981). The complex should refill slowly and with naturally occurring runoff and collection and, therefore, should not increase turbidity or reduce seed stocks for establishing emergent vegetation (Weller et al. 1991). Wildlife will benefit from an increase in foraging and nesting habitat if the natural ecosystem functioning and wetland complex of Dahl Lake is restored.

Temporary wetlands are important for breeding waterfowl, especially early nesters such as mallards and teal, because they provide isolation and spacing. In addition, their shallow waters warm rapidly, providing the first invertebrate food resources in spring (Swanson et al. 1974, Baldassarre and Bolen 1994). However, seasonal wetlands also provide abundant invertebrate foods and nesting cover for species that nest over water.

Most species exploit different types of wetlands to gain various life history requirements. This illustrates the importance of maintaining a complex of wetlands. For example, American bitterns nest in shallow (<10 centimeters) water with dense, robust emergents, while trumpeter swans will nest in water >50 centimeters. Both black terns and trumpeter swans need abundant, floating, dead vegetation. Providing a mosaic of wetland types with a healthy, robust, emergent plant community, well interspersed with open water, will provide habitat for a diversity of waterbirds.

Restoring the wetlands and Dahl Lake wetland complex will increase wildlife habitat—as well as comply with the habitat development plan, which is a result of a FERC-approved settlement between the Department of the Interior, the MPC, and the CSKT. The settlement was for mitigation of habitat and wildlife losses on the Flathead WPA caused by past and future operations of Kerr Dam by the MPC. The refuge has 3,112 acres because of this mitigation

process. The habitat development plan addresses planned habitat enhancements on the refuge per the "Stipulation and Agreement" (December 12, 1997) and the "Order Approving Settlement." These developments and enhancements are the result of nearly 15 years of study, assessment, planning, and negotiations between the MPC, the CSKT, and the Service.

The Northern Rocky Science Center has expressed an interest in conducting research that evaluates how western montane wetlands function. These data, in association with NWI classifications, would provide an understanding of how the naturally occurring fluctuations in water levels of Dahl Lake wetland complex function and the response of associated vegetation and wildlife. These data are a critical link between land management decisions and the appropriate response or result. Subsequently, this would foster the restoration of the biological integrity of the refuge, while restoring wetland habitat that has been increased as habitat and food sources for nesting and foraging waterfowl.

Wetland Habitat Objective 4

Conduct a wetland study in the Dahl Lake complex to determine how montane wetlands function as recharge and discharge basins within 6 years of CCP approval, to determine effects on vegetative, invertebrate, and wildlife associations.

Strategy

1. Collaborate with USGS's Northern Rocky Mountain Science Center on management of wetlands.

Rationale

Same rationale as for objective 3.

Wetland Habitat Objective 5

Restore natural wetland vegetation in Dahl Lake wetland complex by reducing reed canarygrass by 40–80 percent within 10 years of CCP approved, to allow the reestablishment of sedge, rush, mint, pondweed, cattail, and bulrush as the dominant plant species.

Strategies

1. Evaluate soils and water regime for optimum sites for reed canarygrass control.
2. Determine the best method of reducing reed canarygrass including use of chemicals, fire, disking, and grazing.
3. Map sites of invasive plant treatment each year in the GIS.
4. Monitor reed canarygrass control efforts and vegetation coverage, and use adaptive management.

Rationale

Dahl Lake water levels have been stabilized at a lower level for multiple years to promote drying of the upper portions of the meadow for hay pasture. A consequence of stabilized water levels is promotion of cattail and reed canarygrass growth in the wetland, which can reduce the attractiveness to waterfowl (Smith and Kadlec 1986). Reed canarygrass will often grow into a monoculture reducing species diversity. Although some waterfowl species use reed canarygrass as nesting substrate, it is not a native plant species.

In the past, cattle grazing has kept the reed canarygrass in check to some degree. However, it still has taken over the wetland with approximately 750 acres in units 14 and 19; therefore, some type of control must be attempted. In unit 14, the largest section of *Phalaris* is still interspersed with *Carex*, and therefore, hopefully has a chance at restoration to native species.

Kilbride and Paveglio (1999) described a four-step method of controlling reed canarygrass that included a late spring application of herbicide (Rodeo), disking in summer, application of herbicide the next growing season, and inundation with water until mid-June. However, with early high-water levels, this method may not be appropriate. It would also be dependent on how much area can be disked. Further review of the literature and consultation with experts will provide the best management practice available.

Many waterbirds use the emergent vegetation of the Dahl Lake wetland complex. A colony of black terns (Montana species of concern), has been nesting in this area along with other species such as American bittern, sora, (potentially) Virginia rail, and redheads. Although some bird species will nest in reed canarygrass, native plant species diversity will be increased with species such as cattail and bulrush, along with a variety of wetland plants such as *Carex*, *Scirpus*, *Juncus*, *Typha*, *Mentha*, and *Potamogeton*. These wetland plant species will increase food and nesting substrates for a greater diversity of wildlife.

Wetland Habitat Objective 6

Inventory for fens (alkaline bogs) within 1 year of CCP approval, to protect from invasive plants.

Strategy

1. Survey wet meadows for dominant plant species and presence of peat; measure pH of soil in suspect areas.

Rationale

Fens are sedge-dominated emergent wetlands in northern regions that have an underlying layer of peat covered with many species of mosses and aquatic macrophytes. A fen is similar to a bog, but is

alkaline rather than acidic with a much higher nutrient content. Fens gain nutrients found in precipitation, surface water, and groundwater, whereas bogs are fed by nutrients in precipitation only (Aerts 1999).

Wet meadows are like fens, but are much more numerous across the country and are dominated by plants including sedges, rushes, and grasses such as reed canarygrass. Fens are special management areas that the Service would like each refuge to inventory for future protection.

Grassland Habitat

This management direction is for the diverse grasslands that cover the majority of the refuge.

Goal

Restore, enhance, and maintain Intermountain grasslands, with an emphasis on native bunchgrass prairie, to provide habitat for migratory birds, species of concern, and associated wildlife species.

Ray Washtak/USFWS

Central Pleasant Valley

Grassland Habitat Objective 1

Fence and post the entire refuge boundary within 3 years of CCP approval, to make clear to the public when they have entered or exited the refuge, and to prohibit unauthorized livestock grazing.

Strategies

1. Survey or find markers in areas of uncertainty for the refuge boundary.
2. Fence and post the refuge boundary; use staff from the National Bison Range Complex or contracted personnel.
3. Use wildlife-friendly boundary fencing in areas of high wildlife use, where feasible.

Rationale

The refuge is surrounded by PCTC lands that are open to public use and grazing leases. Many individuals hunt, mountain bike, and horseback ride in the area. These uses are restricted on the refuge. The public needs to understand when they are on the refuge so that they stay in compliance with regulations.

Boundary fencing is needed in areas of grazing leases to prohibit trespass grazing.

Grassland Habitat Objective 2

Develop soil descriptions for the entire refuge within 1 year of CCP approval (coordinate with NRCS), for a baseline understanding of soils to help with future management considerations.

Strategies

1. Use existing soils layers to determine which soils have not been classified.
2. Sample soils and describe associated climax vegetation for each unclassified type; perform through a request to the NRCS.

Rationale

Management success for specific plant communities is dependent on soil type. The soils layer has been defined for the refuge; however, many of the soil types are unique to the area and have not been classified. NRCS can classify the soil types with sampling and through literature review of associated plant communities. This information is crucial for determining whether a particular plant community can be achieved with a management practice. It may also help explain or understand invasive plant control efforts or encroachment and native plant restoration.

Grassland Habitat Objective 3

Maintain native grasslands (1,450 acres) not closely associated with wetlands (north of Pleasant Valley Road, figure 9), for a healthy Palouse prairie grassland dominated by Idaho and rough fescues, and western wheatgrass (Idaho fescue with average 8–12 flower stalks per plant, 20–22 centimeters in maximum leaf length per plant, 14–17 square centimeters live basal area [Mueggler 1970, 1975], and an average 12.7–22.9 centimeters leaf height [Pond 1960]; and rough fescue with an average 25–30 centimeters leaf height [McLean and Wikeem 1985]), to provide a vigorous plant community for ground-nesting migratory birds and forage for other wildlife.

Strategies

1. Gather technical guides for vegetative climax communities for each soil type; coordinate with NRCS.
2. Monitor vegetation (live basal area, leaf height, leaf length, and flower stalks/plant) to determine current habitat condition and monitor for management thresholds every 2 years.

3. Consider rest, grazing, and prescribed fire to achieve and maintain healthy, vigorous, native grasslands.
4. Use short-term management practices (e.g., grazing or fire) to remove decadent, residual vegetation (every 5–7 years [Kirsch et al. 1978], 6–7 years [Gilbert and Woodling 1996], 5–10 years [Barker et al. 1990]), depending on productivity, precipitation, and monitoring results.
5. Monitor plant species occurrence and percent cover along with wildlife use pre- and postrestoration.

Rationale

Upland grasslands overlay rolling topography that grades into forest habitat and encompass approximately 1,500 acres. The majority of the upland grassland areas are native grasses. Native bunchgrass prairie is an important habitat coverage that is limited in the northwest. The refuge has a substantial tract that can be conserved for use by native wildlife species and public use, including environmental education. Upland habitat restoration is also part of staying in compliance with the habitat development plan.

The refuge was a working cattle ranch prior to refuge establishment and some areas have been overgrazed, which has led to areas with invasive plants and sparse vegetation with low productivity. Impact of defoliation on plant vigor is depression of herbage and flower stalk production. For vigor to recover in grassland species such as Idaho fescue, areas of extremely poor vigor may need 6–7 years of rest, while bluebunch wheatgrass can take up to 10 years (Mueggler 1975). In areas of intermediate vigor, Idaho fescue may be able to recover after 3 years of protection (Mueggler 1975). Resting will allow management to determine grassland conditions for plant species composition and vigor (cover, height, and productivity).

The best management practices with the use of rest, prescribed fire, and grazing can be developed based on evaluating which tool at a particular timing would maintain native, vigorous bunchgrass uplands for nesting migratory birds and forage for other wildlife. Grazing will need to be used cautiously with either none, or limited to light grazing after the growing season, for maintenance of cool-season bunchgrass areas.

Repeated grazing may reduce the ability of Idaho fescue to compete with spotted knapweed when both are grazed (Olson and Wallander 1997), and grass defoliation in spring increases spotted knapweed cover compared to summer defoliations (Jacobs and Sheley 1999).

The habitat development plan is a result of a FERC-approved settlement between the Department of the Interior, the MPC, and the CSKT for mitigation of habitat and wildlife losses on Flathead WPA caused by past and future operations of Kerr Dam by the MPC. The refuge has 3,112 acres because of this mitigation process. The habitat development plan addresses planned habitat enhancements on the refuge per the "Stipulation and Agreement" (December 12, 1997) and the "Order Approving Settlement." These developments and enhancements are the result of nearly 15 years of study, assessment, planning, and negotiations between the MPC, the CSKT, and the Service.

Monitoring for flora and fauna response to land management will provide feedback crucial for determining whether management efforts are achieving their desired outcome. This adaptive approach provides a prescriptive process rather than crisis management. Species will be better provided for in a manner that is driven with a purpose—leading to better chance of success and use of funds and time.

Grassland Habitat Objective 4

Monitor, every 2 years, 336 acres of western wheatgrass in management units 13 and 14, and 45 acres of Kentucky bluegrass in management unit 19 (figures 5 and 9), and maintain as medium-tall, dense grasslands with litter depth of 15–30 mm and 1.5–2 decimeters visual obstruction reading (VOR) to provide habitat for nesting blue-winged and cinnamon teal (Barker et al. 1990, Gilbert and Woodling 1996, Livezey 1981).

Strategy

1. Develop a habitat management plan describing how rest, prescribed fire, grazing, or haying will be used to maintain migratory bird nesting habitat in areas of: (1) western wheatgrass; and (2) Idaho fescue and western wheatgrass on upland grasslands.

Rationale

Upland grasslands and one unit of bottomland grasslands (figure 5; management units 11, 12, 13, 14, 19) surround the Dahl Lake wetland complex. These grasslands will be managed for waterfowl-nesting habitat based on their location and grass species. Though waterfowl hunting is not allowed, the Service is working towards improving waterfowl habitat and the potential to provide hunting in the future. These grasslands are native and tame grasses, but the *Alopecurus* is not considered in the objective acreages, since another objective promotes restoring it to native species.

It has long been established that vegetation structure and litter are what avian species key into for nest site selection rather than species composition (Cody 1968, Wiens 1969, Kantrud and Higgins 1992). Therefore, it is acceptable to work with tame grasses for ground-nesting birds.

However, with initiatives such as "Bring Back the Natives," refuges are putting more effort into maintaining and working with native plant communities when possible and feasible. To achieve and maintain the above-stated desired vegetative condition, short-term management practices (e.g., grazing or fire) will be used to remove decadent, residual vegetation (every 5–7 years [Kirsch et al. 1978], 6–7 years [Gilbert and Woodling 1996], or 5–10 years [Barker et al. 1990]) depending on productivity, precipitation, and vegetation-monitoring results].

Maintaining vigorous, medium-tall grassland around Dahl Lake will provide waterfowl nesting habitat along with benefits to other species such as the short-eared owl, savannah sparrow, meadowlark, and northern harrier. The public will be able to enjoy increased opportunities for wildlife observation and photography, due to increased use by birds and other species such as moose, elk, and bear.

Grassland Habitat Objective 5

Monitor, every 2 years, 190 acres of Idaho fescue and western wheatgrass in upland grasslands around the Dahl Lake wetland complex (management unit 11, figures 5 and 9), and maintain as tall, dense grasslands with litter depth of 15–30 mm and 3 decimeters VOR (Kirsch et al. 1978, Duebbert and Lokemoen 1976, Kruse and Bowen 1996), to provide nesting habitat for mallard, gadwall, and lesser scaup.

Strategy

1. Develop a habitat management plan describing how rest, prescribed fire, grazing, or haying will be used to maintain migratory bird nesting habitat in areas of: (1) western wheatgrass; and (2) Idaho fescue and western wheatgrass on upland grasslands.

Rationale

Same rationale as for objective 4.

Grassland Habitat Objective 6

Monitor 900 acres dominated by Idaho fescue and rough fescue (management units 8–10, 12, 15, and 20; figure 5) every 2 years; for Idaho fescue with an average 8–12 flower stalks per plant, 20–22 centimeters maximum leaf length per plant, 14–17 square centimeters live basal area (Mueggler 1970, 1975), and an average 12.7–22.9 centimeters leaf height (Pond 1960); to determine when management action is needed to maintain vigorous plant communities for ground-nesting migratory birds and forage for other wildlife.

Strategies

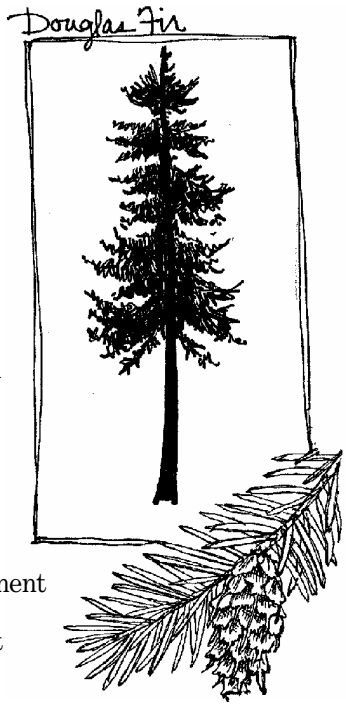
1. Monitor vegetation (live basal area, leaf height, leaf length, and flower stalks/plant) to determine current habitat condition and monitor for management thresholds every 2 years.
2. Use grazing and prescribed fire as habitat management tools for Idaho or rough fescue once monitoring results demonstrate management targets have been achieved and compatibility agreements have been developed with the NRCS.

Rationale

The refuge and WRP easement south of the county road has a wide diversity of sedges, native grasses, and forest. With rest, native fescue will continue to recover vigor, depending on precipitation. Once vegetation targets are met, some disturbance will be required to maintain vigor, unless native herbivores are concentrating in these areas. Close monitoring and collaboration with NRCS is required, as well as interagency permission to conduct management practices on these easement tracts.

Forest Habitat

Coniferous and deciduous forests are addressed in the management direction for forest habitat.



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Goal

Enhance and maintain Douglas-fir, ponderosa pine, aspen, and cottonwood forested habitats within the context of the Fisher River watershed for migratory birds, species of concern, and other associated wildlife species.

Forest Habitat Objective 1

Identify forest coverage types within 1 year of CCP approval, to ensure management activities do not hinder the biological potential of forest habitats.

Strategies

1. Classify forest vegetation into National Vegetation Classification Standards; map in geographic information system database.
2. Review forest lands for habitat needs by rare, threatened, and endangered species.

Rationale

Initial efforts to classify the forests on the refuge combined the largest area possible for dominant tree species, and other available habitat types within large forest areas may be missing.

Several wildlife species of concern could be using forest habitats. Forest habitat is not a priority for

refuge management, however, as wildlife stewards, the Service should still determine what is within their boundaries, and not conduct any management that would hinder species of concern and their biological potential.

Bald eagles are nesting in aspen forest and golden eagles are nesting in Douglas-fir forest. Olive-sided flycatchers, flammulated owls, and black-backed woodpeckers are priority species (level 1) for the MPIF program. They are found in open-canopy woodlands, open-canopy ponderosa pine, and closed-canopy lodgepole pine, respectively. Olive-sided flycatchers have been recorded to occur on the refuge.

Yellow-billed cuckoos are a federal candidate species that could be using the cottonwood–aspen woodland associations. Grizzly bears and wolves are known to occur in the surrounding forested area, and Canada lynx could potentially be using the refuge as a corridor or foraging through the area.

Since there are no resources available to conduct forest management to improve the habitats for any of these species, management actions will be monitored and reviewed to ensure they do not hinder the use of these habitats by these species.

Forest Habitat Objective 2

Evaluate forest coverage, age, and density related to surrounding lands owned by PCTC and USDA Forest Service within 4 years of CCP approval, to determine what habitat type is the least represented in the ecosystem that can be managed for on suitable refuge lands.

Strategies

1. Inventory forest cover type, age, and density in Pleasant Valley through habitat classification and discuss management options for the refuge from an ecosystem perspective, in collaboration with PCTC, Montana Department of State Lands, and USDA Forest Service.
2. Categorize forest stands by species, age, and density; perform through a request to PCTC and USDA Forest Service. Determine how best to provide a corridor of habitat connectivity for the grizzly bear, gray wolf, and Canada lynx to national forests, working with endangered species biologists.
3. Classify forest vegetation into National Vegetation Classification Standards; map in the GIS database.
4. Survey for deteriorating aspen stands—as defined by a low density of stems that are young and small, and with poorer form and higher crown-to-stem ratios than healthy stands (Schier and Campbell 1978).
5. Annually monitor for effects of any restoration project on aspen, willow, birch, and alder.
6. Annually monitor for negative effects of water level changes on aspen groves in management units 12 (3 acres), 14 (23 acres), and 19 (24 acres) to determine if there is a loss in acreage.
7. Monitor effects of prescribed fire in aspen and apply adaptive management.
8. Inventory forest use by NTMBs, native mammals, amphibians, and reptiles to obtain baseline data.

Rationale

There is not enough forested habitat to provide all life requirements for species such as the grizzly bear, gray wolf, and Canada lynx. However, with the large tracts of adjacent USDA Forest Service and PCTC lands, the refuge could provide an important linkage area for these species.

Forest Habitat Objective 3

For the duration of the CCP, maintain a ponderosa pine, mixed-conifer forest with widely spaced trees (20-foot spacing between pines), open grassy areas, and an understory of fescue or junegrass and snowberry or kinnikinnick, to conserve a major forest type that facilitates the biological integrity of the ecosystem.

Strategies

1. Halt Douglas-fir encroachment of young even-aged stands of ponderosa pine; remove Douglas-fir >2 feet tall and up to 6 inches dbh, and ponderosa pine >2 feet tall and up to 4 inches dbh.
2. Suppress understory fires except in areas where age-class structure is being altered to abnormally dense stands dominated by younger trees.
3. Maintain all existing large snags and broken-top trees >20 inches dbh for nesting purposes.
4. Control invasive plants with cutting and herbicide in forest.

Rationale

Stands of large ponderosa pine historically dominated most dry forest sites in western Montana. These dry forests are composed of a mix of ponderosa pine and Douglas-fir. Logging and fire suppression have resulted in an alteration of age class structure, physical structure, tree density, and tree species composition (Barrett 1979, Schubert 1974, Shepperd et al. 1983). Large, old-growth trees in open settings have been replaced with dense stands of younger trees.

Many priority bird species—such as the Lewis's woodpecker, pileated woodpecker, olive-sided flycatcher, flammulated owl, white-breasted nuthatch, and Williamson's sapsucker (all noted on the refuge)—are closely associated with old forest

stages and snags. Regional populations of these species have decreased due to the reduction of old forest stages.

Other species that are favored by the public such as elk and deer should benefit as well. Elk live in high elevations in semi-open forests and mountain meadows during the summer. In the winter, elk migrate to lower sheltered valleys, windswept meadows, and lower wooded slopes. Tree lichen is important forage for deer and elk during winter (Baty et al. 1996). Typical diet consists of mainly grasses, sedges, and forbs. The refuge may be able to provide more old-growth habitat to foster these species.

Invasive Plants

Prevention and control of nonnative, invasive plants are addressed in the management direction for invasive plants.

Goal

Native plant communities, composition, occurrence, and density exist without degradation by invasive plants, and support associated wildlife.

Invasive Plant Objective 1

Develop and implement an invasive plant management plan within 1 year of CCP approval that identifies: (1) the extent of encroachment by spotted knapweed, tansy ragwort, sulfur cinquefoil, and St. Johnswort; (2) suitable control methods; and (3) monitoring needs; to document infestations and provide an index to effectiveness of management actions.

Strategies

1. Evaluate invasive plant infestations and control efforts since refuge establishment.
2. Determine the extent of infestation of sulfur cinquefoil; create a baseline map.
3. Identify locations of new infestations of tansy ragwort; map locations and collaborate with the state coordinator for mapping records for neighboring PCTC land.
4. Gather information about cumulative impacts of chemical, biocontrol, and prescribed fire effects on invasive plants and on native vegetation response; review literature.
5. Determine appropriate, effective control methods, e.g., mowing, chemical, biocontrol, and prescribed fire; consult with experts.
6. Determine the best restoration method and plant species of replacement in invasive plant infestations; consult with experts.
7. Map sites of invasive plant treatment each year in the GIS.
8. Monitor infestation rates and effectiveness of control efforts; annually map the extent of infestation of spotted knapweed and tansy ragwort in the GIS.

Rationale

Invasive plant control is a legal and popular issue for many national wildlife refuges, as well as required to comply with the habitat development plan. The primary reason for control is that invasive plants displace native vegetation and impact wildlife by reducing availability of forage, cover, and nesting sites.

The refuge has not yet been inundated with a large number of invasive plant species. Spotted knapweed and tansy ragwort are the two most common and noticeable invasive plants. Sulfur cinquefoil exists intermingled with the native cinquefoil, so the extent of this problem has yet to be defined. Spotted knapweed is fairly dispersed and needs to have priority for control efforts to keep it from becoming dominant. Tansy ragwort is a new, encroaching invasive plant on the refuge that is in many isolated pockets; eradication may still be possible if heavy effort is put into early control. The refuge will continue in partnership with the working group that has been established for working on tansy ragwort control within the area.

Invasive plant control is costly in both time and money. Successful control requires careful planning, implementation, and monitoring. Past efforts and current infestation levels will be evaluated and monitored for effectiveness. This needs to be done to demonstrate that time and effort are not wasted. Chemical and biological control are the two most common control methods used on these invasive plants. However, careful application of chemicals will be essential to produce the desired result for native vegetation composition.

Biological control will need to be evaluated for the benefits and impacts to determine whether a nonnative species should be introduced on refuge lands.

- Determine if a biological control would switch from the target invasive plant to a native species.
- Determine demonstrated success in other areas with limiting or eradicating encroachment.
- Determine that a biological control would not alter or disrupt the native insect community, especially in regards to native pollinators.

Biocontrol agents have been shown to reduce the spread of invasive plants. However, controversy exists over whether there are direct effects of biological control on nontarget species, as well as indirect effects.

Pearson et al. (2000) demonstrated that the establishment of the biological control agent,

Urophora spp., altered deer mouse diets and habitat selection by effecting changes in foraging strategies. This could result in spiraling changes to the food web. For example, a small mammal population increase could be followed by an increase in raptors, foxes, and skunks. These species also prey on ground-nesting migratory birds. On the other hand, increases in small mammals have been shown to result in less nest predation because predators are using the small mammals as alternative prey. However, high populations of small mammals can result in increased ground disturbance from tunneling, which often creates perfect sites for dispersal of invasive plants.

Spotted knapweed is the primary invasive plant found on the refuge. Invasive plants have undergone extensive range expansion and often create dense stands that turn native plant communities into invasive plant wastelands. The presence of invasive plants can alter the functioning of ecosystems by loss of wildlife habitat, displacement of native species, change in carrying capacity from reduced forage production, lowered plant diversity, and increased soil erosion and sedimentation.

Spotted knapweed aggressively invades grassland and early successional forest sites (Rice et al. 1997a). As spotted knapweed increases on a site, other species decline (with up to a 60–90 percent decrease in graminoid production) (Harris and Cranston 1979, Bucher 1984, Morris and Bedunah 1984).

A limited staff at the refuge complex has been providing collateral effort for invasive plant control since establishment of the refuge. This will continue until a maintenance worker and a biologist are added to the staff. This will limit the control effort to the stated, annual average of 200–400 acres. The refuge will continue to explore opportunities for grants and partnerships for additional invasive plant control and volunteer recruitment to maintain or expand control efforts.

The presence of invasive plants can alter the functioning of ecosystems by loss of wildlife habitat, displacement of native species, change in carrying capacity from reducing forage production, lowered plant diversity, and increased soil erosion and sedimentation.

These negative effects from invasive plants require control, which includes chemical, biological, and hand pulling for tansy ragwort, spotted knapweed, and sulfur cinquefoil to maintain native grasses and Spalding's catchfly.

Herbicide use for invasive plants will decrease the ability of these plants to outcompete the grasses and native forbs for light, water, nutrients, and pollinators.

Herbicide use will be distributed throughout the refuge and applied at the rate according to the label. Spraying will be monitored. There should be no detrimental effect from too much herbicide in one location. A negative effect could occur from care not being taken where aerial spray of Tordon® drifts onto forested areas and young trees are killed. If any, only negligible impacts should occur from herbicide use in the water systems due to application following label guidelines and refuge policy.

Care must be taken with prescribed fire in areas of invasive plants. Judicious removal of invasive plants needs to be conducted at least 2 years prior to use of prescribed fire to prevent seed production and dispersal (Goodwin 2001). Otherwise, prescribed fire could increase the coverage of invasive plants and reduce native grasses and forbs. Prescribed fire may have to be prohibited in areas of dense occurrence of invasive plants (with low to absent desired plant cover), to prevent rapid and expanded growth of invasive plants due to fire-produced disturbances. This approach of careful control prior to burning should have great positive benefits for reinvigorating and increasing Spalding's catchfly habitat.

Invasive Plant Objective 2

Reduce spotted knapweed to a level of 25 percent or less of overall grassland area within 3 years of CCP approval, to maintain native vegetation for wildlife forage, cover, and nesting.

Strategies

1. Apply integrated pest management for spotted knapweed, consisting of: (1) proper spring and fall chemical applications; (2) mechanical mowing where practical, prior to seed head production; and (3) release of appropriate biocontrol agents, including seed head gall flies and other proven biocontrol agents.
2. Survey proposed spray areas for Spalding's catchfly prior to herbicide application.
3. Limit off-road vehicle travel and wash the undercarriages of vehicles that access off-road areas.

Rationale

Same rationale as for objective 1.

Invasive Plant Objective 3

Annually eradicate and maintain 75–90 percent control of tansy ragwort with an extensive survey and treatment effort coordinated with PCTC and the state coordinator for tansy ragwort, to maintain native vegetation for wildlife forage, cover, and nesting.

Strategies

1. Use the GIS to predict areas at greatest risk of new invasions and develop early detection and prevention measures.

2. Identify locations of new infestations of tansy ragwort; map locations and collaborate with the state coordinator for mapping records for neighboring PCTC land.
3. Treat new invasions of tansy ragwort in late July and early August by bagging flower heads and burning them, and spraying rosettes with chemicals such as Transline® or Tordon®.

Rationale

Same rationale as for objective 1.

Invasive Plant Objective 4

Annually conduct invasive plant control on 200–400 acres of upland grasslands for 15 years after CCP approval, to maintain native prairie composed of 90 percent native vegetation composition.

Strategies

1. Use ground and aerial herbicides to inhibit and eradicate encroachment by invasive plants.
2. Survey proposed spray areas for Spalding's catchfly prior to herbicide application.
3. Evaluate the target species selectiveness of any biocontrol species prior to release.
4. Annually attain herbicide and/or a technician to apply herbicide and assist with mapping by pursuing grant funding.
5. Attain assistance with invasive plants (applications and monitoring) by pursuing grant funding through the project advisory committee, e.g., RMEF grants, until the refuge can support its own needs for control.
6. Mitigate disturbance of refuge roads with invasive plant control and reseeding of native species, through ongoing cooperative work with the PCTC.
7. Monitor vegetation of upland grasslands for vigor and plant species composition every 2 years.

Rationale

Same rationale as for objective 1, plus the following rationale.

Prior to acquisition of the refuge, the PCTC entered into an easement exchange for road maintenance within and bordering the lands that today comprise the refuge. With the acquisition of the refuge, the Service inherited that same easement exchange.

Invasive Plant Objective 5

Restore native grasses and sedges over 85 percent of the area where there is introduced creeping meadow foxtail (figure 9), starting within 1 year of CCP approval, to increase plant diversity and provide wildlife habitat.

Strategies

1. Set priorities for restoration within the WRP easement (345 acres) in the bottomlands (see south of the county road, figure 9), in collaboration with NRCS restoration efforts.
2. Determine the best restoration method and plant species of replacement; consult with experts and review literature.
3. Complete WRP restoration of the remaining 512 acres in the bottomlands and 145 acres in the uplands, after securing funding.
4. Monitor plant species occurrence and percent cover along with wildlife use pre- and postrestoration.

Rationale

The refuge has 1,000 acres of *Alopecurus*. This species is palatable, but a poor-nutrition forage grass for big game; while it can provide some nesting cover for waterfowl (Hitchcock 1971). These species are often seeded with timothy (*Phleum pratense*); plant diversity is reduced by the vigorous spread and domination of the occupied area. Control will require elimination along with simultaneous introduction of a desirable competitor (Weaver et al. 1990). These areas are temporarily flooded wet meadows (USFWS 1982) with many sedges already interspersed throughout the areas adjacent to native grasses.

A partnership is already established with NRCS for the WRP easement. The WRP easement has plans for native plant restoration. Restoration efforts are often costly and time consuming; the feasibility of restoring all tracts of *Alopecurus* is likely cost-prohibitive. The collaboration of the Service and NRCS should provide quicker results with greater cost efficiency than by working alone, hence a priority for areas within the WRP easement. Future efforts can be placed toward the remaining bottomland areas adjacent to the WRP easement and finishing with the areas in the more upland sites.

Invasive Plant Objective 6

Conduct a surveillance program for new infestations of invasive plants by walk-through surveys every 2 years in priority areas (roads, boundaries, and heavy use areas), to maintain native prairie.

Strategies

1. Gather information about invasive plant occurrence; inform all Service employees that may work on the refuge about plant and habitat characteristics of invasive plants to get help finding invasive plants during normal field duties.
2. Conduct walk-through surveys for invasive plants with volunteers to look for new infestations.

Rationale

Same rationale as for objective 1.

Invasive Plant Objective 7

Coordinate invasive plant control in Pleasant Valley by meeting at least once per year to share information and discuss control strategies: (1) with PCTC for spotted knapweed; and (2) with PCTC and the USDA Forest Service for tansy ragwort.

Strategies

1. Evaluate invasive plant infestations within Pleasant Valley for priority areas of control by each partner.
2. Share GIS layers of invasive plant infestations with PCTC and the USDA Forest Service.
3. Maintain the easement exchange with the PCTC to mitigate disturbance of refuge roads with invasive plant control efforts and reseeding of native species.

Rationale

It is important to maintain adequate and timely coordination with the PCTC, USDA Forest Service, neighbors, and other groups on all issues related to the control of invasive plants. This coordination will allow all parties to share information and act cooperatively in coordinated efforts to control a shared problem of invasive species. It will also allow all parties to ensure that their lands do not become a springboard for invasive species into neighboring lands.

Migratory Birds

Management direction for migratory birds addresses waterbirds (waterfowl, shorebirds, and other waterbirds) and other migratory birds.

Goal

Preserve, restore, and enhance the ecological diversity and abundance of migratory birds of the Intermountain West forest, wetland complexes, riparian habitat, and bunchgrass prairie.

Donna Dewhurst/USFWS

Canvasback with Brood

Waterbirds Objective 1

Determine waterfowl nest success, causes of nest failure, and food availability through a cooperative project initiated within 5 years of CCP approval, and develop a waterfowl management plan that uses adaptive management to achieve a 5-year average of 25–40 percent nest success, to increase waterfowl populations.

Strategies

1. Restrict public use to designated trails and roads from May 15 to September 1 in bottomlands between South Pleasant Valley Road and the county road to decrease disturbance to nesting birds and increase nest success.
2. Use habitat manipulation and predator control as adaptive management tools to increase production when necessary to achieve objectives.
3. Inventory and monitor emergent and submergent vegetation availability for forage substrate in late summer and fall.
4. Continue duck pair counts and implement duck brood index survey.
5. Initiate nest dragging to determine hen success and rates of nest predation.
6. Monitor invertebrate levels in Dahl Lake and wetland complex to determine if this is a limiting factor.
7. Hire a biologist to be stationed at the refuge.
8. Seek partners and volunteers to design and fund methods, and assist in determining production of waterfowl.

Rationale

Although habitat may be the most important resource necessary to produce ducks, additional factors may also affect production, including predation, lack of suitable food substrate, and human disturbance. Surveys will be developed to determine waterfowl nest success, causes of nest failure, and food availability. Adaptive resource management will then be applied to increase production.

Disturbance can negatively affect waterfowl production by decreasing the number of breeding pairs, hatching success, and survival of the young. Disturbance during pair bonding, and nest building and initiation can cause waterfowl to nest elsewhere or not at all. Several studies have identified human disturbance as the cause of desertion or abandonment of nests, especially during early incubation (Korschgen and Dahlgren 1992). Flushing hens away from the nest, leaving the eggs exposed to predators and the elements, can affect nest success. Human-created trails and markers may also increase predation rates on hens and eggs.

Disturbance during brood rearing may break up and scatter broods leaving them vulnerable to predation, exposure, and starvation.

At Bosque Del Apache National Wildlife Refuge (New Mexico), waterfowl increased nitrogen levels by 40 percent and phosphorus levels by 75 percent in the winter of 1995–1996 (Post et al. 1998).

An index from pair-count surveys is used to evaluate production and how management practices are affecting it. Duck pair counts have been conducted on Dahl Lake and other wetlands since establishment of the refuge. Pair counts are conducted once during the nesting season in mid- to late May or early June. Pair-count data will only establish an estimate of how many pairs are nesting. Average brood size, hen success, and survival to fledglings must also be calculated to determine production:

Duck Production =

# of pairs × average brood size × nest success × constant of 0.7 (survival to fledgling)

Average brood size, hen success, and survival to fledglings must be calculated to determine production. This requires additional staff and partnerships to conduct duck brood surveys and nest dragging. Conducting these surveys on the refuge will more accurately assess production. Nest dragging will be conducted to determine nest success and to ascertain causes of nest failure. This baseline information will be used to develop a waterfowl management plan with a goal of 25–40 percent nest success averaged over 5 years. A nesting success of approximately 15–20 percent is suggested to maintain stable duck populations. (Cowardin et al. 1985, Greenwood 1986, Klett 1988).

Nest predation by mammals, and to a lesser extent by birds is the major proximate cause of nest failure (Cowardin et al. 1985, Greenwood et al. 1987, Klett et al. 1988). Predation can be limited directly through predator trapping and indirectly through habitat manipulation and expansion to increase nest security. Predator control is often expensive and time consuming; therefore, habitat manipulation will be used to increase nest success, unless continued monitoring suggests that predator control is needed.

Another limiting factor to duck production is forage. Aquatic invertebrates play a critical role in the diet of most female ducks during the breeding season. Ducklings feed on aquatic invertebrates until approximately 1 month old, and then gradually increase consumption of seeds and vegetation. The Dahl Lake wetland complex will be surveyed to determine available forage for female ducks and broods in the spring and early summer. Hens and broods switch to seeds and vegetation later in the summer and fall and these resources will be surveyed.

Monitoring the effect that wetland enhancement projects conducted under the habitat development plan and the NRCS restoration project have on fall waterfowl populations will be an important focus. Nest mapping or nest searching will better quantify the effects of restoration efforts. Surveying will more accurately portray species use of the refuge and help determine how best to provide habitat for the life needs of these species.

Waterbirds Objective 2

Use adaptive resource management to maintain or increase (using a 5-year average) the Canada goose population using the refuge for nesting and brood rearing to foster goose populations.

Strategy

1. Share the expense and workload of aerial pair and brood counts for waterfowl with MFWP; Avista Utilities; and the CSKT.

Rationale

The National Bison Range Complex completes three aerial surveys for geese with partners; the CSKT, MFWP, and Avista Utilities. The two surveys that include the refuge are the goose pair count and goose brood survey. The midwinter waterfowl survey is not conducted on the refuge due to early ice-over of the wetlands. The pair survey was not conducted for several years, but has been resumed. These data are important to evaluate population trends from year to year and are used by MFWP for hunting regulations. The brood survey is used to calculate production.

Waterbirds Objective 3

Monitor waterbird and shorebird use of the refuge during fall migration to determine limiting factors, within 10 years of CCP approval, to determine effective management to increase fall populations.

Strategies

1. Continue to prohibit waterfowl hunting until a minimum average of 1,000 ducks from opening day of waterfowl season until the start of freeze-up are present.
2. Conduct weekly waterfowl surveys from mid-August until freeze up.
3. Conduct invertebrate and vegetation surveys to determine available forage from mid-August until freeze-up.
4. Determine limiting factors and conduct research; consult with the Montana Cooperative Wildlife Research Unit and other experts.

Rationale

Fall populations of waterfowl on the refuge appear to be low compared to other areas in western Montana. Weekly surveys will be conducted to determine base

numbers for comparison with similar habitat. The refuge will work with partners and volunteers to conduct surveys of available forage resources. Experts will be consulted or a research project will determine what the limiting factors are to fall waterfowl populations.

A hunt plan was developed in 2001. One of the issues that were raised was to provide opportunities for waterfowl hunting. Waterfowl hunting is not permitted, due to low numbers of ducks and geese using the refuge during hunting season. In the EA for the hunt plan, it was stated that waterfowl populations and habitats would be evaluated in the future to determine the potential for hunting opportunities. The waterbirds objectives address that promise. Implementation includes monitoring the effect that wetland enhancement projects conducted under the habitat development plan and the NRCS restoration project have on fall waterfowl populations.

W.F. Kubichek/USFWS

Common snipe have been sighted in refuge habitats.

Waterbirds Objective 4

Evaluate biological potential for shorebirds and marsh birds (including American bittern, sandhill crane, long-billed curlew, and black-crowned night-heron), presence, and nesting within 7 years of CCP approval, to preserve biological integrity.

Strategies

1. Determine nesting requirements of shorebirds and marsh birds and best management practices; review literature.
2. Evaluate sandhill crane nesting; develop a plan to improve nesting if cranes are nesting or attempting to nest on the refuge.
3. Survey for availability of dense, tall (>60 centimeters) emergent vegetation for nesting cover for bitterns, terns, and redheads.
4. Prohibit haying, mowing, and grazing immediately proceeding and during the nesting season of shorebirds and marsh birds.
5. Monitor for shorebirds and marsh birds during duck pair and brood counts, NTMB surveys, and with playbacks.

Rationale

Wetland-dependant species are important to ecosystem health and many are listed as priority species under the U.S. Shorebird Conservation Plan and the MPIF initiative. These species are difficult to record with traditional monitoring and general observation. Monitoring such as taped calls may be needed to record their presence. Once monitoring is accomplished, management practices can be developed to promote these species. The refuge will be surveyed to determine the status of shorebirds, marsh birds, and sandhill cranes.

One of the goals of the U.S. Shorebird Conservation Plan is to ensure that adequate quantity and quality of shorebird habitat is maintained at the local level. The conservation plan is split into individual regional plans with the refuge falling in the Intermountain West subregion. By monitoring and protecting shorebird habitat, the refuge can aid the Intermountain West region in obtaining two of their regional goals.

- *Habitat Management Goal:* Maintain and enhance diverse landscapes that sustain thriving shorebird populations.
- *Monitoring and Assessment Goal:* Acquire information on shorebird distribution and abundance for shorebird conservation.

Species of shorebirds known to breed in the northern Rocky Mountains that are listed as priority 3 (important) for conservation value include the black-necked stilt, American avocet, greater yellowlegs, willet, spotted sandpiper, Wilson's phalarope, and common snipe. The long-billed curlew is listed as priority 4 (very important). The snowy plover, killdeer, and upland sandpiper may occur in the area, but are not listed as priority species. Twenty-three additional species occur annually as migrants—6 in moderate numbers and 17 in small numbers.

The American bittern is a priority 3 species for the MPIF initiative. It is a secretive species, which makes it difficult to monitor and, therefore, hard to determine occurrence and abundance. It is critical to establish distribution of this species and provide protection before they are lost in northwestern Montana. The biological potential exists for bitterns at the refuge, but surveys have not been conducted. Bitterns may nest in reed canarygrass (Dechant et al. 1999) and prefer relatively large (7.4 acres) wetlands.

One of the goals of the refuge as stated in the EA and conceptual management plan (1998) is as follows:

> to provide optimal feeding and resting habitat for waterfowl, cranes, other migratory waterbirds, and shorebirds.

At least two pairs of sandhill cranes have been observed during spring and summer. Colts have been observed, so nesting has occurred. Surveys will be conducted to determine nesting density and success.

Young shorebirds are especially vulnerable to mortality from hay cutting. In Harney Basin, Oregon, it was estimated that one operator killed 400–600 shorebirds (primarily Wilson's phalarope) by mowing between July 1 and July 13 (Oring et al. 2003). Unlike ducks, shorebirds (especially Wilson's phalarope) tend to remain in hay meadows to feed after hatching. Consequently, even the earlier-nesting species are vulnerable to mowing. Bitterns will not tolerate haying, mowing, or grazing during or immediately prior to nesting season.

Disturbance will be limited to increase production and survival. Human-induced increases in predation are a severe problem for breeding shorebirds in the Intermountain West (Oring et al. 2003). Shorebirds have higher metabolic rates than do birds of similar size (Wilson 1991). They are less likely to tolerate poor quality food. The effects of disturbance on shorebirds include reduced foraging time due to displacement and reduced food supply due to compaction of substrate (Hamann et al. 1999).

Other Migratory Birds Objective 1

Monitor NTMBs to determine species presence and refuge use; survey throughout habitat development and at least 10 years thereafter, to determine the effects of implementation of the habitat development plan and WRP restoration on these species.

Strategies

1. Continue existing NTMB surveys along Pleasant Valley Creek and the refuge road system with staff or volunteers.
2. Conduct additional surveys and nest success monitoring for NTMBs to examine more closely the effects of the Pleasant Valley Creek restoration project, working with NRCS, partners, and volunteers.
3. Conduct NTMB surveys, and nest success monitoring in forest, shrubland, cottonwood, and aspen habitats.
4. Hire a biologist to be stationed at the refuge.

Rationale

Since Lost Trail is a relatively new refuge, documentation of avifauna is not well developed. Two point-count surveys were initiated in 2000. The first survey consists of 20 points along the South Pleasant Valley and county roads. This survey encompasses various habitats including grassland, wetland, and forest. The second survey is a walking survey along Pleasant Valley Creek. It starts in a forested riparian area on the north end of the refuge and ends in a grassland riparian area by the county road.

These surveys were developed to determine species presence and use, to develop a species list, and to monitor the effect that implementation of the habitat development plan and NRCS restoration projects have on avifauna. Although point-count surveys will provide information on changes in species presence and general abundance, nest mapping or searching will better quantify the effects of restoration efforts.

The staff will work with the NRCS to develop intensive surveys along Pleasant Valley Creek, during and after restoration. NTMB surveys will be conducted in additional habitats such as forest, shrubland, and cottonwood and aspen woodlands. These additional surveys will more accurately portray species use and help staff determine how best to provide habitat for the life needs of these species.

From a landscape perspective, the refuge is located in cattle country and healthy native prairie is disproportionately represented. Destruction and degradation of suitable habitat for NTMBs is a major factor in the decline of grassland bird species. Migratory birds will benefit from the restoration of grasslands to reflect natural conditions. Monitoring will be used to determine presence and absence of species, and production of indicator species, to assist managers in developing habitat management plans.

Other Migratory Birds Objective 2

Obtain baseline data on relative abundance and production of indicator species of NTMBs (as set forth in guidelines by MPIF), owls, and hawks, within 7 years of CCP approval, to determine "best management practices" that will maintain or increase production in the next 10 years to comply with the Conservation of Avian Diversity in North America Policy (USFWS 1990).

Strategies

1. Set priorities for species by habitat and sensitivity rating and manage for key indicator species in each habitat; use the MPIF guidance.
2. Analyze survey data for the most common priority species and their habitat requirements; apply adaptive management to foster their populations.
3. Maintain diverse healthy habitat and an abundant prey base for raptors.
4. Continue established point counts; conduct additional surveys (point counts, nest dragging, nest searching, and playback surveys) in the upland grasses, forest, and NRCS restoration areas.
5. Conduct surveys that detect woodpeckers.
6. Conduct owl surveys in suitable habitat following the protocol set out in Guidelines for Nocturnal Owl Monitoring in North America (March 2001) as a silent listening technique,

adding playback surveys that are recorded separately.

Rationale

In the past, management decisions were often based on single species or habitats. Recently, preserving ecosystems has been receiving more attention as resource managers recognize the need for a landscape perspective in conservation. Landscape planning is extremely important to the conservation of NTMBs, since managing a habitat to the benefit of one set of species would inherently be a detriment to other species.

The landscape approach to NTMB management is necessary to ensure there is enough ecological variety to support all native species simultaneously over a broad landscape. Thus, special emphasis can be placed on regionally rare or threatened species and habitats without compromising habitat of more common species.

Long-term conservation of NTMBs cannot be achieved on the refuge level. No refuge is ecologically isolated from activities and conditions in surrounding areas. Population sizes and viability of NTMBs are determined by interactions between local habitat factors and regional or landscape features such as total habitat area and biogeography.

One of the primary goals of gathering information about populations of birds that breed on the refuge is to determine how best to provide habitat for their life needs. The Service is the primary federal agency responsible for conserving, enhancing, and protecting migratory birds. By managing for and monitoring nongame migratory birds, the refuge can assist the Service in meeting the following goals of the National Wildlife Refuge System:

- Perpetuate migratory bird resources.
- Preserve natural diversity and abundance of fauna and flora on refuge lands.
- Provide refuge visitors with high quality, safe, wholesome, and enjoyable recreational experience oriented toward wildlife.

These objectives also help the refuge to meet its goal (as outlined in the EA and conceptual management plan) to "preserve a natural diversity and abundance of flora and fauna, with emphasis on Neotropical migrants."

Partners in Flight uses a system that identifies species of conservation priority in each of its planning units, rather than writing planning information for all species. If conservation measures are focused on these species and their habitats, it is expected that other species in the area will benefit as well.

MPIF has identified a pool of species that represents priorities for conservation action within Montana. A species may be considered a priority for several different reasons, including global threats to the species, high concern for regional or local populations, or high state responsibility for conserving large or important populations of the species. MPIF also identified target habitats for conservation and study in the northern Rocky Mountains. The refuge contains three of these habitats—ponderosa pine forest, grassland, and marsh and wetland.

Relatively little is known about the abundance and population trends of most species of nocturnal owls in North America. Most species of owls are poorly monitored by existing NTMB surveys. In the last few decades, there has been increasing concern over the status of both diurnal and nocturnal raptors. Birds of prey are high on the food chain and are, therefore, highly susceptible to changes in the environment, which makes them good indicator species.

Broadcast surveys are one of the most widely used techniques to locate and survey owls. Broadcasting recordings of owl vocalization can increase calling rates. In September 1999, guidelines were developed for standardizing owl-monitoring surveys ("Guidelines for Nocturnal Owl Monitoring in North America," Takats 2001).

Other Migratory Birds Objective 3

Protect nesting habitats including 80 percent of natural snags, annually monitor and maintain bluebird and wood duck nest boxes, and allow installation of 20 additional nest boxes in available habitat, to increase populations of cavity-nesting species.

Strategies

1. Protect snags in forest habitat.
2. Construct and place new nest boxes for NTMBs in unoccupied, suitable habitat using volunteers.
3. Monitor nesting and maintain structures and boxes using volunteers and refuge staff.

Rationale

About 85 species of North American birds excavate nesting holes, use natural cavities resulting from decay, or use holes created by other species in dead or deteriorating trees. The absence of suitable nest sites is usually considered the limiting factor for cavity-nesting species (Thomas et al. 1979). The Partners in Flight Montana Bird Conservation Plan includes retention of all large snags and broken-top trees. Management for adequate numbers over the landscape is a critical objective to maintain viable populations of the Lewis's woodpecker and flammulated owl.

Other cavity-nesting priority species in Montana that will benefit from the retention of snags include the black-backed woodpecker, three-toed woodpecker,

Williamson's sapsucker, pileated woodpecker, downy woodpecker, red-naped sapsucker, pygmy nuthatch, red-breasted nuthatch, white-breasted nuthatch, hairy woodpecker, and western screech-owl.

Dave Menke/USFWS

The red-breasted nuthatch nests in tree cavities.

Western and mountain bluebirds are found in the Pleasant Valley area. Populations of mountain bluebirds declined about 6 percent annually across western North America according to the National Breeding Bird Survey. Bluebird populations have rebounded since the box program became popular in the 1980s. There has been a significant decrease in natural nesting cavities for bluebirds throughout the country, due to increased urbanization with a corresponding decrease in the number of dead trees and replacement of wooden fence posts with metal. Compounding the problem of habitat loss has been the introduction of two imported species—the house sparrow and the European starling. Both species are cavity nesters that aggressively compete with bluebirds for cavities.

A bluebird box trail was established along the road system in the refuge, in the early spring of 2001. Bluebird boxes were donated and volunteer Erv Davis and the Pleasant Valley School established the trail. The Pleasant Valley School monitors and maintains the boxes. Although bluebirds are not currently a priority species for Montana, the maintenance of this bluebird trail is useful as an educational tool, to interest students and the public in NTMBs and their conservation.

Endemic Wildlife

Resident wildlife including large and small mammals, resident birds, amphibians, and reptiles are addressed in the management direction for endemic wildlife.

Goal

Restore and maintain resident and endemic wildlife populations of northwestern Montana to maintain and enhance species diversity of Lost Trail National Wildlife Refuge and Pleasant Valley.

Large Mammals Objective 1

Maintain deer, elk, and moose populations at a minimum of 75 percent of current levels on the refuge for the next 15 years, to maintain ecological diversity and a healthy ecosystem.

Strategies

1. Improve habitat quality through invasive plant control, native plant restoration, prescribed fire, and grazing.
2. Evaluate all public uses for their effects on herd numbers and distribution of wildlife on the refuge.
3. Monitor deer, elk, and moose use of refuge habitats to determine high-use areas and design public use activities around these areas.
4. Develop a system to estimate deer and elk populations on the refuge; review literature for current, valid methods.
5. Monitor abundance and presence of elk (in the winter), deer (in the summer), and moose (in the spring or summer).
6. Determine baseline populations of large mammals; monitor for 3 years and consult MFWP.
7. Hire a biologist to monitor and evaluate wildlife population dynamics, and to conduct necessary control.

Rationale

The refuge is important winter habitat for a herd of approximately 300 elk. Moose and deer are primarily spring, summer, and fall residents. Although it will be difficult to manage for specific population numbers due to the wide range of these species across the boundaries of the refuge, the Service wants to ensure that their management decisions (i.e., hunting, public access, and vegetation manipulation) are not detrimental to large mammal populations, neighboring landowners, and habitat. Fluctuations in population sizes are natural and may occur for many reasons. If a decrease below 75 percent of current herd sizes occurs, managers must

determine the cause of the change and if modifications in management are warranted.

Prior to establishment of Lost Trail as a national wildlife refuge, the land had been in private ownership. Opening the area to the public and public uses such as hunting and wildlife viewing may directly affect large mammal populations through hunting and indirectly through disturbance that may cause stress to the animals or changes in behavior. Disturbance can force animals off highly nutritious summer and fall range and onto less productive range. This may result in poorer body condition going into winter, which has been linked to lower reproductive performance and even death. Early fall movements may also leave nutritious summer forage uneaten at the cost of overgrazing winter range.

An example of this change in behavior was observed in Colorado. In the White River elk herd, an increase in early season hunting by bow hunters caused elk to move off their summer ranges before fall migration. The elk moved onto private land and secure areas. This led to complaints from local landowners of crop damage, complaints from resource managers that riparian areas were being damaged by this redistribution, and complaints by early season hunters of lower success rates in the public hunt areas (Conner et al. 2001).

Since the refuge has only recently been open to public hunting, it is still difficult to know if implementing the public use program may lead to elk movement and redistribution with corresponding overpopulation problems in localized areas including private lands. To increase landowner tolerance for big game animals and to minimize big game damage, it is advantageous for land managers to work with wildlife managers to reduce displacement of animals from public to private lands.

Large Mammals Objective 2

Modify or remove all nonessential fences within 1 year of CCP approval, to enhance movement of large mammals.

Strategies

1. Identify fence locations and determine their importance for refuge management; map using a global positioning system.
2. Remove interior fences. Modify exterior fences by working with the PCTC grazing lessee to develop fencing standards that facilitate wildlife movement while excluding cows from the refuge.
3. Incorporate additional gates into fences where it is not feasible to modify them; keep gates open when livestock are not present in grazing units.

Rationale

The refuge contains approximately 30 miles of interior fence, 10 miles of fence along the county road, and 20 miles of exterior fence. These fences were important for domestic herd management prior to establishment of the refuge. However, they are not necessary for refuge management and can be harmful to wildlife. If fences become necessary on an interim basis, temporary fences (electric or barbless wire) can be constructed.

Wildlife can become entangled in fences, which can cause serious injury or death to an animal. At least five animals (four elk and one moose calf) have been found caught in fences on the refuge in the last few years. Fences can pose a hazard to ungulates by blocking escape routes, and allowing predators to more easily catch and kill animals. This is especially true of young animals that cannot follow adults over a fence. Young animals are also separated from their mothers by fences when the adult jumps the fence and the young cannot follow. The young, stranded animal often runs the fence line until the animal becomes caught in the fence or is killed by a predator.

The refuge receives up to 3 feet of snow in the winter. High snow levels may impede movement of ungulates through fences by blocking access under the fence. To alleviate this problem, all gates should be left open in the winter. Gates may also be added to remaining fences along the boundary and the county road.

Large Mammals Objective 3

Develop a plan for chronic-wasting disease (surveillance and contingencies) within 1 year of CCP approval, to monitor and manage this large mammal disease, and complement state efforts.

Strategies

1. Conduct a passive surveillance program for clinical signs of chronic-wasting disease or other health problems (may lead to a targeted surveillance based on results); conduct monthly, opportunistic observations of deer and elk.
2. Coordinate proposed prevention, surveillance, research, and control actions for chronic-wasting disease in cooperation with state wildlife and agriculture agencies.
3. Conduct outreach to surrounding communities and communication to refuge visitors regarding chronic-wasting disease and disease management.
4. Remain alert to potential threats from chronic-wasting disease or other diseases.

Rationale

Chronic-wasting disease is a brain disorder that can cause death in deer and elk. It is highly contagious

and can have serious impacts on populations. The refuge will be proactive in detecting chronic-wasting disease to prevent establishment of the disease, which could lead to a catastrophic loss of deer and elk. This adaptive approach provides a prescriptive process rather than crisis management.

The national scope and high profile of chronic-wasting disease, combined with Service responsibilities for wildlife resources that span state and federal jurisdiction, make it essential that the Service cooperate with other state and federal agencies in addressing this illness.

Chronic-wasting disease is a transmissible spongiform encephalopathy of deer and elk. Although the exact causative agent is unknown, the disease is related to infectious proteins that are resistant to normal metabolic breakdown processes and abnormally accumulates in the brain and brain stem. Consequentially, neurons die, which results in clinical signs referable to brain impairment. Eventually, diminishment of body condition and death occur.

There has been an increased distribution of chronic-wasting disease within and among states, and combined with high prevalence reported in some states has resulted in national and international attention to this disease. Therefore, it is the policy of the refuge to implement cooperation and coordination with other state and federal agencies in monitoring and managing this disease.

Large Mammals Objective 4

Annually monitor large mammal abundance, presence, and areas of use to establish baseline data and determine impacts on habitat for the development of adaptive resource management strategies to keep populations within the carrying capacity of the refuge to promote ecological diversity and ecosystem health.

Strategies

1. Develop a system to estimate deer and elk populations on the refuge; review literature for current, valid methods.
2. Monitor abundance and presence of elk (in the winter), deer (in the summer), and moose (in the spring or summer).
3. Determine baseline populations of large mammals; monitor for 3 years and consult MFWP.
4. Categorize the vegetation in areas of high use by deer, elk, and moose; map locations and categories.
5. Ensure deer and elk are staying within the carrying capacity; evaluate areas of high use for browse-line impacts.
6. Determine if large mammal resource damage is a result of local factors or reflects an ecosystem phenomenon, through comparison of deer and elk population trends on the refuge with MFWP trend data for the ecosystem.
7. Evaluate the effects of public use in areas of habitat damage to determine if overuse of specific habitats by deer and elk is a result of wildlife response to disturbance.
8. Determine best management practices to use in response to monitoring data on deer and elk populations. Determine how refuge management is affecting the populations or how they are affecting the refuge. Coordinate with MFWP. Apply adaptive management, e.g., modify hunting seasons, or use fire, invasive plant control, or grazing to improve forage.
9. Hire a biologist to monitor and evaluate wildlife population dynamics, and to conduct necessary control.

Rationale

Since Lost Trail is a relatively new refuge, management practices may result in large mammal populations increasing beyond carrying capacity, or may cause animals to concentrate in areas of high use, resulting in vegetation damage. Harassment by hunters and other public users may reduce use of select areas causing overutilization of areas with fewer disturbances.

Large mammal populations move freely across the boundaries of the refuge. It will be difficult to manage for a specific number of individuals given the size of their range and seasonality of use of the refuge. Staff can manage habitat and public use to affect population numbers and distribution of wildlife.

Managers must also coordinate with MFWP to evaluate how wildlife responses to practices on the refuge are affecting wildlife on an ecosystem level. In addition, evaluation will determine if effects observed on the refuge are a function of factors beyond the refuge. Vegetation and population dynamics will be evaluated to make and modify management decisions.

Large Mammals Objective 5

Open the refuge to public use only on designated trails from December 15 through April 1 to decrease disturbance and related stress to wintering deer, elk, and moose and to allow recovery of body weight and health in the spring.

Strategies

1. Determine areas of large mammal concentrations (winter range) and avoid public use in these areas.

2. Educate the public on how to minimize winter disturbance and stress to large mammals during recreation activities.

Rationale

Until staff has time to determine big game use of habitats and movements of big game between habitats, recreational impacts on ungulates cannot be determined. Approximately 300 elk winter on the refuge. Winter is a critical time for ungulate survival. Animals that may have occupied thousands of acres of summer and fall range can be seasonally confined to relatively restricted geographic areas on which forage is limited and extreme environmental conditions can cause physiological stress. Almost 40 percent more food is required in winter to generate energy for daily metabolic and activity requirements.

Mackie et al. (1998) observed that, "Deer survive primarily by supplementing energy resources accumulated prior to winter with energy intake from submaintenance winter diets." This requires behavior that emphasizes energy conservation. Inactivity provides an energetic advantage for animals exposed to cold; forced activity caused by human disturbance exacts an energetic disadvantage.

Many ungulates enter early spring at the lowest physiological condition of the year. Until new, green forage restores lost weight and energy, these animals may succumb to stresses that would be considered minor at other times of the year. The development of green vegetation at lower elevations on southerly slopes is also attractive for people following a long winter. Managers can provide an important contribution to energy conservation by reducing or eliminating disturbance of wintering ungulates and restricting recreational use of spring ranges that are important for assuring recovery from winter weight loss.

As long as designated wildlife-viewing areas are not situated in critical survival areas for moose (e.g., calving grounds and winter feeding sites), high-quality photographic and observational opportunities can be provided (Youmans 1999).

Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death. Although winter is a time of lower metabolic rates and activity, ungulates normally lose weight. The degree of disturbance has mostly been reported in terms of flight distance or in some observed change in behavior manifested by animals.

Based on elk heart rate data, Chabot (1991) showed that even when disturbances do not induce an overt behavioral response, the increased heart rates could result in relatively high energy expenditures. Test results have been confirmed and expanded for a variety of ungulates including mule deer, white-tailed deer, and elk (Canfield et al. 1999). Responses of ungulates to human recreation during this critical period may range from apparent disinterest to flight, but every response has a cost in energy consumption. Although much research has been conducted on the effects of snowmobile disturbance on wintering ungulates, snowmobiles appear less distressing than cross-country skiers, hikers, and snowshoers (Freddy et al. 1986, Canfield et al. 1999).

Bull Elk
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The greatest disturbance for many ungulate species comes from unpredictable or erratic occurrences. In addition to increasing energy costs for wintering animals, recreational activity can result in displacement to less desirable habitats, or in some situations, to tolerance of urban environments. Many ungulates enter early spring at the lowest physiological condition of the year.

Disturbance during the summer months may also have a negative impact on big game mammals as they seek optimum forage to provide energy for lactating females and antler growth in males. As summer progresses, impacts are expected to decrease as the snow melts and many animals head off the refuge to expanded summer ranges. Public use also disperses as logging roads and hiking trails open up on PCTC and public land surrounding the refuge.

Elk, white-tailed deer, mule deer, and moose are all herbivores. They forage to varying degrees on grasses, sedges, forbs, leaves, twigs, and stems of woody plants, masts, and fruits.

Small Mammals Objective 1

Monitor Columbian ground squirrel habitat acreage. If monitoring reveals an expansion of 20 percent above baseline, conduct an analysis to determine if habitat damage is sufficient to warrant preparation of a control plan.

Strategies

1. Determine ground squirrel activity centers; map by size of population and percentage cover of vegetation in the GIS.
2. Determine an acceptable baseline level for habitat affected by ground squirrels and their population numbers, using initial data.
3. Determine changes in acres affected by ground squirrels; monitor ground squirrel activity on a 3- to 5-year basis.

Rationale

Small mammal populations are a significant but often overlooked component of ecological communities. Any change in the density or diversity of small mammals can have significant impact and greatly affect the nature of the community. Changes in community structures commonly have ramifications far beyond the initial, small mammal species and may start an ecological chain of events resulting in much broader ecological consequences (Hickman et al. 1999). Despite this, small mammals have been little studied as to the effect that habitat changes and recreation may have on their populations.

Columbian ground squirrels can cause extensive habitat damage and compete with other wildlife for forage and their diggings may accelerate soil erosion. Lambeth et al. (1982) found that, up to a point, ground squirrel populations increased with plant retrogression. Other research has indicated that ground squirrels may move out of stands of heavy vegetation to more open, grass habitat.

Proposed habitat management should keep ground squirrel numbers in check by improving the health and density of native vegetation. Management towards a diverse predator base should also keep ground squirrel numbers in check. Ground squirrel populations will be monitored and adaptive resource management will only be used to reduce populations if a predetermined threshold of affected habitat is crossed.

Ground squirrels are an important source of protein for most predators in northwest Montana including birds of prey, weasels, canines, felines, and bears. The refuge is challenged with managing for predator species along with other native species. Although predators are of secondary importance behind native birds for management, they are critical to maintaining ecosystem health and are popular with public users. A substantial reduction in ground squirrel numbers would adversely affect those species that prey on them. Ground-nesting birds may also be negatively affected as predators switch to alternate prey sources. Therefore, the refuge will maintain ground squirrel numbers within 20 percent of a baseline determined after initial monitoring and literature research.

Resident Birds Objective 1

Monitor, using point counts, resident (nonmigratory) birds, and determine effects of management activities on the species listed as priority for conservation by the MPIF Plan (2000) and the Service's 2002 Birds of Conservation Concern (USFWS 2002) by initiating additional point counts, nest searching and/or nest monitoring; and use adaptive resource management to foster species diversity and populations within 10 years of CCP approval.

Strategies

1. Continue annual NTMB surveys and detect all resident and migratory birds through addition of one survey route in the uplands.
2. Inventory for Montana Bird Conservation Plan priority 1 species such as flammulated owls and black-backed woodpeckers.
3. Implement an owl survey once a year for the next 3 years, using volunteers.
4. Record any incidental sightings of bird species on the refuge.
5. Determine potential effects of management activities to species listed as priority for conservation by the MPIF Plan (Casey 2000) or the Service's office of migratory bird management (1995).

Rationale

Two NTMB survey routes have been run annually since 2000. The first of these routes follows the Pleasant Valley and South Pleasant Valley roads. The other is located on Pleasant Valley Creek, running from its inception onto the refuge to the Pleasant Valley Road. Neither one of these surveys adequately covers the upland habitats on the refuge. Migratory bird surveys are conducted in daylight hours using bird songs as the primary method of detection. Some resident species may not be detected using this method. Examples include species such as owls that are vocal predominantly in the evening, woodpecker-drumming patterns that are hard to distinguish between species, and marsh birds that are difficult to detect using traditional NTMB surveys.

The MPIF Plan (Casey 2000) and the Service's office of migratory bird management (USFWS 1995b) have prepared lists of bird species of concern. Several of these species can occur in habitats that exist on the refuge. The refuge may be able to contribute to these species' conservation simply by considering potential impacts from management activities prior to their implementation.

Resident Birds Objective 2

To reduce disturbance and increase nest success probability, site-specific management activities or public use activities will not be permitted within 0.5-mile of any occupied golden eagle nest.

Strategies

1. Monitor for the arrival and nesting of golden eagles.
2. Limit disturbance within at least 0.5-mile from any occupied golden eagle nest; consider temporary implementation of alternate routes of public use or management.

Rationale

Anecdotal information on golden eagles suggests that cumulative impacts on birds of prey from increased recreational activities may result in reduced nest success or nest abandonment (Canfield et al. 1999). A GIS-assisted viewshed approach, combined with a designated buffer zone distance, was found to be an effective tool for reducing disturbance to golden eagles in Colorado (Clark et al. 1989).

The golden eagle is protected under the Bald Eagle Protection Act of 1940, as amended in 1962 (P.L. 87-844). Montana's population of golden eagles may be currently declining due to low productivity (Canfield et al. 1999). The Montana Bald Eagle Management Plan suggests a 0.5-mile radius buffer zone around bald eagle nests; therefore, the same criteria will be used for golden eagles.

Resident Birds Note

Specific objectives have not been developed for upland game birds. However, it is expected that meeting habitat objectives will indirectly benefit upland game species.

Amphibians and Reptiles Objective 1

Gather amphibian and reptile population data (breeding surveys, population size and trend) in cooperation with the USGS, as part of the Amphibian Research and Monitoring Initiative, to develop "best management practices" within 5 years of CCP approval, to foster amphibian populations and increase knowledge of amphibian, reptile, and habitat dynamics.

Strategies

1. Learn survey techniques and design surveys; coordinate with the Amphibian Research and Monitoring Initiative team.
2. Develop habitat guidelines for amphibians and reptiles; consult experts.
3. Report amphibian data to the regional level, i.e., the Amphibian Research and Monitoring Initiative team, to support ecosystem-level monitoring.
4. Include the use of equipment, housing, or vehicles for refuge in-kind support to the USGS for the Amphibian Research and Monitoring Initiative.
5. Hire biological staff or use the biologist from the National Bison Range Complex, along with volunteers, to conduct monitoring.
6. Collaborate with amphibian and reptile biologists to determine the effects of implementing the habitat management plan may have on the boreal toad.

Rationale

Reptiles and amphibians are important components of the biological integrity and functioning of an ecosystem. There are known and suspected declines of amphibians throughout North America, with a significant proportion of amphibians native to western United States (Corn 2000). Hossack (2003) explains, "In response to documented and suspected declines in the United States, a national effort identified as the Amphibian Research and Monitoring Initiative was launched in 2000 to determine the status and trends of amphibian populations on Department of Interior lands nationally and to provide information useful in determining causes of declines."

To determine the cause of amphibian and reptile declines as well as the scope of a decline, a baseline for comparison must be determined.

Survey data will be used to develop habitat guidelines and best management practices to protect and enhance these species. Reptiles and amphibians vary greatly in life history patterns. A single species may require a diversity of habitats. Aquatic areas with specific microhabitats and water temperatures are required for egg development, larval growth, and metamorphosis. Adults require different foraging and overwintering habitats—some aquatic, some terrestrial.

The diversity of needs, combined with the variety of unique habitats and microhabitats required to complete a life cycle, makes the impacts of recreation, water manipulation, and habitat alteration on herpetofauna difficult to study.

Amphibians and some reptiles require terrestrial and aquatic habitat to complete their life cycles. Adults generally live on land and lay their eggs in water. When the eggs hatch, they remain in aquatic environment as they metamorphose from tadpole to adult. Water temperature is critical to egg development and survival with each species having a maximum and minimum temperature at which it can survive.

Reptiles and amphibians select habitats with diverse physical characteristics including: (1) adequate sun exposure and water temperature; (2) substrates that are adequate for nesting and basking; (3) habitats that support insects and vegetation necessary for

foraging; (4) aquatic habitats with mud bottoms for protection and deep waters that are unlikely to freeze; and (5) terrestrial habitats with animal burrows or deep litter for overwintering.

Many species are philopatric, choosing the same breeding, foraging, wintering, and migrating habitat year to year.

Hossack et al. (2001, 2002) found evidence of boreal toads breeding on 5 of 20 sites surveyed in 2001 and on 15 of 28 sites in 2002. Boreal toads were located at less than 5 percent of other forested sites surveyed in Montana since 1999. Dahl Lake has the largest reproducing population known for the Rocky Mountains (based on the number of larvae observed). There is concern that this species is declining in the region. Evidence from Glacier National Park and Lost Trail National Wildlife Refuge shows that breeding sites are often clustered in a small area, putting them at risk for environmental change and for local extirpation.

Amphibians and Reptiles Objective 2

Biannually conduct presence/absence surveys for bullfrogs and take control actions to prevent the establishment of this species, to protect native amphibians and reptiles from this introduced predatory amphibian.

Strategies

1. Learn survey techniques and design surveys; coordinate with the Amphibian Research and Monitoring Initiative team.
2. Teach all staff to identify bullfrogs.
3. Contact local experts about eradication procedures for bullfrogs.
4. Hire biological staff to conduct monitoring and control, if necessary, for bullfrogs.

Rationale

Bullfrogs are not native to Montana. However, they have been widely introduced across the United States and now exist along the Bitterroot, Flathead, and Clark Fork rivers. Bullfrogs can affect amphibian and reptile populations directly through predation and indirectly through the avoidance of sites where bullfrogs are present. Bullfrogs have been implicated in the declines of several amphibian and reptile species.

NOTE: Specific objectives for boreal toads can be found in the following species of concern section.

Species of Concern

This management direction addresses wildlife listed by state or federal agencies as threatened and endangered (or proposed or candidate for listing), sensitive, rare, or species of concern. For the refuge, the species of concern are listed below:

- grizzly bear
- gray wolf
- Canada lynx
- bald eagle
- trumpeter swan
- black tern
- boreal toad
- Spalding's catchfly (plant)

The impacts on these species were considered in the development of objectives in the other sections such as habitat and public use. Managers must evaluate all actions prior to implementation to ensure that the action will not have a negative impact on endangered and threatened species.

Appendix J (section 7 biological evaluation) provides detailed information on how the management activities delineated in this CCP were determined to not adversely affect the life and activities of species of concern in the refuge. It addresses federally listed species, as well as species of management concern for the state of Montana and the Partners in Flight program.

Goal

Contribute to the conservation, enhancement, and recovery of endangered, threatened, and species of concern populations in Lost Trail National Wildlife Refuge and Fisher River watershed.

Species of Concern Objective 1

Document sightings and locations of rare or unusual plants and wildlife, and consider these species' needs when making management decisions, to ensure the continued existence of rare species.

Strategy

1. Record sightings of rare species during routine staff and volunteer duties.

Rationale

The Service is required to carry out conservation programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species, or adversely modify or destroy their critical habitat.

One of the primary purposes for the establishment of the refuge was to enhance the survival prospects of endangered and threatened species. Listed species that occur on the refuge include bald eagle, gray wolf, and Spalding's catchfly. Species found in the forests surrounding the refuge and that probably use the refuge include the grizzly bear and Canada lynx. Bull trout do not exist on the refuge, but may be affected by management decisions.

Since the enabling legislation includes endangered and threatened species as a purpose for establishment of the refuge—and since the protection of endangered

and threatened species is an inherently federal function with primary oversight by the Service—this plan has placed emphasis on these species.

Species of Concern Objective 2

Inventory and monitor species of concern, and rank species according to restoration and protection priorities, within 10 years of CCP approval, to develop guidelines for consideration of these species in management decisions.

Strategies

1. Categorize species as follows: (1) priority 1—species that will be managed for protection or increase of populations; (2) priority 2—species that will be considered when evaluating effects of management options, but whose habitats will not be targeted for management; and (3) priority 3—species whose habitat requirements will not be considered in making management decisions.
2. Focus inventory efforts and determine reestablishment potential; research historical occurrence data and use.
3. Monitor for occurrence of species of concern in Pleasant Valley, in coordination with partners, interns, and volunteers.
4. Hire a biologist to be stationed at the refuge to coordinate monitoring.
5. Monitor and survey to develop comprehensive species lists; use refuge staff, interns, and volunteers.

Rationale

Since Lost Trail is such a new refuge, not all species using the refuge have been documented. Refuge staff must determine if a species currently exists on the refuge and then the biological potential for recovery or enhancement for the species must be evaluated.

In addition, the rationale for "species of concern objective 1" applies to this objective.

Species of Concern Objective 3

Develop a conservation easement program (preliminary project proposal), encompassing the Fisher River watershed, within 3 years of CCP approval, to protect private land from development to minimize wildlife/human conflicts and to conserve habitat for large, far-ranging carnivores.

Strategies

1. Develop a conservation strategy with PCTC to protect their lands from future development.
2. Develop a preliminary project proposal for the conservation easement program, delineating a focus zone and priority areas.
3. Seek funding from the Land and Water Conservation Fund for a conservation easement program.
4. Monitor for occurrence of species of concern in Pleasant Valley, in coordination with partners, interns, and volunteers.
5. Partner with the MFWP, Partners for Wildlife, the USDA Forest Service, and private organizations such as the Nature Conservancy and the Montana Land Reliance to obtain support and funding.

Rationale

The Service is mandated to preserve and protect endangered species and to ensure conservation measures are available to prevent species of concern from becoming threatened or endangered. The refuge will protect all threatened, endangered, or species of concern on the refuge and will evaluate the feasibility of restoring historical threatened and endangered species, or species of concern.

Voluntary habitat conservation efforts, such as land or vegetation management plans and conservation easements will ultimately benefit many wildlife species (Sime 2002).

Private lands, in particular, have substantial value to wildlife because they frequently occur at low elevations with moderately extreme weather conditions such as deep snow.

The refuge will develop an outreach program to raise public awareness of those species located in the Pleasant Valley area. As the public becomes more aware of threatened, endangered, and species of concern in their area, they will be more likely to notice and document the occurrence of these species. As they develop an understanding of the life history of these species, their importance in the ecosystem, and the reasoning behind management decisions, they will be more likely to accept restoration and protection efforts.

Grizzly Bear Objective 1

Protect the grizzly bear habitat linkage zone between the CYE and the NCDE through coordination with neighboring landowners, within 5 years of CCP approval, to assist in recovery of the grizzly bear.

Strategies

1. Follow guidelines of the Grizzly Bear Compendium (LeFranc et al. 1987) to provide habitat and security within the Pleasant Valley area.
2. Identify and secure funding for conservation easements in the grizzly linkage zone; coordinate with the Interagency Grizzly Bear Coordination Team, the Flathead and Kootenai national forests, PCTC, MFWP, Montana DNRC, NRCS, and private landowners.
3. Develop an outreach program for the public on the grizzly bear and recovery efforts, to develop better support for and understanding of the

species and to minimize adverse human actions and conflicts. Work with the interpretation and education subcommittee of the Interagency Grizzly Bear Committee.

Rationale

Where grizzly bear habitat was once continuous in the Rocky Mountain ecosystem, habitat fragmentation from human settlement and development has created isolated populations of grizzly bears. When a species exists as geographically separate populations, some level of movement and gene flow between them decreases their probability of extinction (Soule 1987, Harrison 1994, Serveen 2001). It is important to the survival of the species that individual bears from one localized population encounter individuals from other populations to maintain genetic variation. The probability of successful movement between grizzly bear populations depends on what is happening in the intervening areas between them. Thus, the management of linkage zones to maintain and enhance movement opportunities is a critical part of the successful recovery of the grizzly bear (Serveen 2001).

The refuge is located between the NCDE and the CYE of grizzly bear recovery. Potential linkage areas across Highway 2 remain between the towns of Marion and Libby. Grizzly bear recovery biologists believe that securing the future of the grizzly bear is dependant upon maintaining opportunities for linkage of wildlife populations across areas of human development (Serveen et al. 2001).

Habitat fragmentation is usually accompanied by habitat loss, increased disturbance and increased human–wildlife conflicts. The primary causes of fragmentation in grizzly habitat are human activities such as road building and residential, recreational, and commercial development. Conservation easements maintain agricultural lands and prevent increased fragmentation. Conservation efforts have been initiated in the area surrounding the refuge. The NRCS has purchased conservation easements from willing landowners in the Pleasant Valley area, and the largest private landowner in the area, PCTC, signed a conservation easement with MFWP on 142,000 acres in the Fisher and Thompson river drainages. The refuge should work with other conservation organizations as well as the NRCS and MFWP to continue and expand this effort to preserve open space and limit fragmentation of habitat.

Managing human-induced mortalities is a major factor in the recovery of the grizzly bear. Therefore, it is crucial to the recovery effort that the public understand reasons for actions in order to generate tolerant or positive attitudes toward the bear. The interagency grizzly bear coordination team has appointed an information and education subcommittee to develop education programs and disseminate information. Private conservation organizations interested in the recovery of grizzly bears also provide valuable assistance when they include appropriate information in their publications and news releases.

Chris Servheen/USFWS

Grizzly bears are one of the federally threatened species that occur in Pleasant Valley.

Grizzly Bear Objective 2

Develop a plan to improve grizzly bear habitat on the refuge within 10 years of CCP approval, to assist in recovery of the grizzly bear.

Strategies

1. Follow guidelines of the Grizzly Bear Compendium (LeFranc et al. 1987) to evaluate habitat and security within Pleasant Valley.
2. Evaluate current grizzly habitat components of Pleasant Valley; use the GIS and consultation with neighbors.
3. Complete a biological assessment and interagency cumulative effects assessment of existing and proposed land uses that could affect grizzly bears or their habitat.
4. Concentrate refuge efforts to supply those components of grizzly bear habitat that are limiting in the Pleasant Valley area.

Rationale

Maintaining the linkage area between the NCDE and CYE is important to the continued survival of the species. The grizzly bear has an increased risk of extinction because the population consists of a limited number of individuals that live in several distinct populations geographically isolated from one another. Small populations are less able to absorb losses caused by random environmental, genetic, and demographic changes (Serveen et al. 2001).

Linkage zones are areas between separated populations that provide adequate habitat for low densities of individuals to exist and move between isolated populations. The resulting exchange of

genetic material helps maintain demographic vigor and diversity, increasing the viability of individual populations. For the grizzly bear, preserving the linkage between populations is as critical to long-term conservation of the species as managing the individual populations.

Grizzly Bear Objective 3

Prohibit livestock grazing if a grizzly bear is within 1 mile of the refuge, to decrease the likelihood of grizzly bear depredation, forage competition with livestock, and the chance of individual bears becoming habituated to livestock as a food source.

Strategy

None.

Rationale

The refuge is located in an area classified as a management situation II under the Interagency Grizzly Bear Guidelines (USDA Forest Service 1986). Although grizzly bears occasionally inhabit the area, lack of highly suitable habitat and security precludes extensive use. The grizzly bear is important, but not the primary use of the area, and the refuge will not be managed exclusively for the grizzly bear at the expense of other priority species. However, the Service is required to carry out conservation (recovery) programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species, or adversely modify or destroy their critical habitat.

The refuge is located in an important linkage corridor for grizzly bears between the NCDE and CYE. Thus, it is important to maintain habitat and security for the grizzly bear.

Livestock grazing can have a significant impact on grizzly bears. In the NCDE, livestock depredation was the most common offense for which a bear was relocated (Thier and Sizemore 1981). Furthermore, these relocations were much less successful than relocations for other offenses (success being no return and no further conflict).

Knight et al. (1985) reported that depredations (livestock and property) were the leading cause of nonhunting mortality in the NCDE from 1975 to 1984. Unreported grizzly bear mortality related to livestock operations may be a significant part of the overall mortality. Jorgensen (1979) reported that only 41 and 17 percent of known bear kills in 1976 and 1977, respectively, were ever reported.

Several studies have addressed the question of whether grizzly bears can coexist with livestock without depredation. Knight and Judd (1983) reported that all radio-tracked bears (except one orphaned cub) that encountered sheep killed them. However, Claar et al. (1999) found that only 2 out of 20 marked grizzly bears in the Mission Mountains (in the NCDE) were involved in sheep depredations, although almost all were in proximity to livestock during spring and fall. Several investigations observed that depredation behavior was apparently a learned process (Johnson and Griffel 1982, Jorgensen 1983, Knight and Judd 1983). Regional difference in depredation may be related to learned behavior and previous levels of control on depredating bears (Johnson and Griffel 1982).

Livestock can also affect grizzly bears through direct competition for early spring browse and by degradation of quality habitat by trampling and grazing. Finally, livestock grazing can affect bears by displacing them off quality habitat as they avoid areas of human activity.

To decrease the likelihood of depredation and the chance of individual grizzly bears becoming habituated to livestock as a food source, livestock grazing will not be permitted on the refuge when a bear is located within 1 mile of the refuge. Livestock grazing will also be restricted to prevent competition for spring forage.

Grizzly Bear Objective 4

To ensure compliance with the ESA and to support the mission of the Service, minimize conflicts with and disturbance to grizzly bears on the refuge by implementing management and public use restrictions when grizzly bears are within 1 mile of the refuge.

Strategies

1. Prohibit black bear hunting.
2. Prohibit hunting of ground squirrels unless it becomes biologically necessary to protect resources.
3. Incorporate suspension provisions into special-use permits for the presence of grizzly bears.
4. Determine the effects that proposed management actions would have on grizzly bears; consult with biologists.
5. Monitor the occurrence and location of grizzly bears in Pleasant Valley, in collaboration with private landowners, MFWP, Interagency Grizzly Bear Coordination Team, USDA Forest Service, and PCTC.
6. Close designated areas to all public access (based on each particular situation) when one or more grizzly bears are within 1 mile of the refuge.
7. Limit administrative activity in areas of grizzly bear activity.
8. Close areas for grizzly bears through the use of signs and other informational material; enforce closures through law enforcement patrols.

9. Evaluate proposed changes in public access prior to implementation; monitor for effect related to the grizzly bear if access is approved.

Rationale

The refuge is located in an area classified as a management situation II under the Interagency Grizzly Bear Guidelines (USDA Forest Service 1986). Although grizzly bears occasionally inhabit the area, lack of highly suitable habitat and security precludes extensive use. The grizzly bear is important, but not the primary use of the area and the refuge will not be managed exclusively for the grizzly bear at the expense of other priority species. However, the Service is required to carry out conservation (recovery) programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species, or adversely modify or destroy their critical habitat.

The refuge is located in an important linkage corridor for grizzly bears between the NCDE and CYE. Thus, it is important to maintain habitat and security for the grizzly bear.

Recreational activities can affect, directly or indirectly, the survival of grizzly bears. Grizzly bears can be directly taken in the defense of human life and through mistaken identity during black bear hunting seasons. In the Swan Range in northwestern Montana, out of 19 known human caused grizzly bear deaths, mistaken identity was the cause of 6 deaths and self defense was the cause of 3 deaths.

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 (Serveen et al. 2001).

Conversely, grizzlies may become habituated to humans. Habituation generally leads to mortality of the bears as the bears are more likely to come in conflict with humans, are more vulnerable to hunters and poachers, and have an increased chance of becoming involved in a collision with a motor vehicle (Claar et al. 1999). Black bear hunting will not be permitted and other recreational activities may be suspended when a grizzly bear is known to be within 1 mile of the refuge.

Ground squirrel hunting is not permitted. Several studies have shown that ground squirrels may be important as a source of protein to grizzly bears and that the restricted availability of animal protein may limit grizzly populations (Nagy et al. 1983, Hechtel 1985, Hamer et al. 1978, Stelmock 1981).

The greatest impact of roads on grizzly bears is an increase in human access into grizzly habitat. Bears react differently to roads depending on habituation and security cover. Roads bring people into contact with bears, may cause bears to avoid habitats, or may habituate bears to humans. The refuge will not permit public use on any additional roads and will curtail administrative activities when grizzly bears are within 1 mile of the refuge.

Timber management and habitat manipulation can also affect grizzly bear use and should be evaluated prior to implementation.

Grizzly bears are not only a source of wonderment to wildlife enthusiasts, but also a source of fear and concern for some of the landowners whose lands border or are near the refuge, especially to those persons whose livelihood is intrinsically tied to domestic cattle and sheep ranching. It is known that these carnivores are opportunistic and kill available animals as prey to survive and feed themselves and their young. Cattle and sheep have been killed by these carnivores in areas where all of these species coexist, such as in western Montana.

Opening the refuge to hunting may affect grizzly bears by increasing the chances of human–bear contact and conflict. Grizzly bears have also been killed by hunters who encounter them unexpectedly. Prior to 1999, 3 bears killed in the Swan Range in Montana and 14 bears from the NCDE had been killed by hunters who felt threatened by the bears (Claar et al. 1999). Hunting may also impact grizzly bears by habituation of these species to kill sites and subsequently humans. Grizzly bears have been documented at kill sites and may even attempt to steal hunter-killed carcasses.

Grizzly Bear Objective 5

To improve support for and understanding of grizzly bears, the refuge's public use staff (or partners) will conduct or coordinate one workshop or field trip per year and will develop at least one interpretive display and one information sheet on the biology and role of grizzly bears in the ecosystem, living with grizzly bears, and the importance of linkage areas to endangered species survival.

Strategies

1. Work with the interpretation and education subcommittee of the Interagency Grizzly Bear Committee.
2. Seek partners such as MFWP, PCTC, Defenders of Wildlife, Flathead and Kootenai national forests, and Great Bear Foundation for grizzly bear conservation.

Rationale

"Gaining the support and confidence of people who live in or near grizzly habitat are one of the greatest challenges to grizzly bear recovery. Efforts that address the attitudes and concerns of the local public serve to foster tolerance and positive attitudes toward

grizzly bears in communities throughout grizzly bear habitat. These efforts include intensive education programs, proactive livestock and garbage management projects that reduce bear attractants on private land, and the maintenance of personal contact between citizens and state and federal wildlife biologists who live and work together in local communities and rural areas near grizzly habitat." (LeFranc et al. 1987)

Managing human-induced mortalities is a major factory in effecting the recovery of the grizzly bear. Therefore, it is crucial to the recovery effort that the public understand reasons for actions to generate tolerant or positive attitudes toward the bear.

Gray Wolf Objective 1

Evaluate the effects of management decisions on gray wolves prior to implementation, and restrict management and public use activities when wolves are present on the refuge, to minimize conflicts with, and disturbance to, gray wolves.

Strategies

1. Prohibit sport trapping.
2. Close the refuge to public access within 1 mile of any active wolf den or rendezvous site from May 1 to July 1.
3. Close designated areas of the refuge to all public access from December 1 to April 15 if wolves are in the Pleasant Valley watershed.
4. Incorporate suspension provisions into special-use permits for the presence of wolves.
5. Determine the effects that proposed management actions would have on gray wolves; consult with biologists.

Rationale

The Service is required to carry out conservation (recovery) programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species, or adversely modify or destroy their critical habitat. Disturbance during denning, around rendezvous sites, and in winter habitat has the potential to affect adversely the survival of wolves in the area.

The presence of livestock on the refuge at any time of the year that wolves are in the area may contribute to depredation or habituation of wolves to livestock as a food source. Wolf–livestock conflicts cause negative public perceptions of wolves decreasing the acceptance of wolves by the public. Public support, particularly from private landowners, is critical to the continued success of wolf reintroduction.

Endangered species cannot be harassed or dispatched on refuge lands. They can be controlled on surrounding federal, state, and private lands if the Service's wolf recovery team has determined that a wolf has habituated to killing livestock and, therefore, meets the definition of a problem wolf.

Lost Trail is one of the first national wildlife refuges in the Intermountain region to support wolves. The policy concerning gray wolves on national wildlife refuges in the western Great Lakes states is that, "gray wolves will be monitored, and refuge habitat management actions will maintain the current prey base for them while they are listed as threatened and for a minimum of five years following any future delisting. Trapping or hunting by government trappers in response to depredation complaints will not be authorized on these refuges." The refuge will follow the same policy until notified otherwise.

Gray Wolf Objective 2

Monitor and maintain habitat and sufficient native prey to support one pack of gray wolves in the Pleasant Valley ecosystem within 5 years of CCP approval (in coordination with MFWP, USDA Forest Service, and PCTC), to address a limiting factor to gray wolf survival.

Strategies

1. Use MFWP data and refuge monitoring of deer, elk, and moose populations to determine changes in the natural prey available to wolves on an annual basis.
2. Maintain sufficient natural prey to support one pack of wolves in Pleasant Valley; use adaptive management.
3. Foster prey for the gray wolf (deer and elk) by improving winter range: apply integrated pest management, plant desirable forage species, and limit disturbance from public use.
4. Evaluate hunting for its effects on prey populations; however, hunting will remain an authorized public use unless determined to be in direct conflict with wolf survival.
5. When wolves are residing in Pleasant Valley, communicate with the wolf recovery team, MFWP, PCTC, and surrounding landowners.
6. Evaluate hunting for its impacts on prey populations for the gray wolf; continue to authorize hunting unless it is determined to be in direct conflict with gray wolf survival.

Rationale

One of the major limiting factors to wolf survival is an adequate prey base. Big game population numbers will be increased by improving habitat. Since deer and elk inhabit PCTC, USDA Forest Service, and private lands off the refuge during much of the year, the refuge will work with other agencies to determine what is limiting ungulate populations in the area. The refuge will then strive to provide or improve specific habitats.

For example, the refuge is an important winter range for elk in the Pleasant Valley drainage (personal communication, MFWP biologists and on-site refuge manager). Upland habitat improvement and time-specific public use restrictions may improve elk survival, which would increase the natural prey base available to wolves in the area.

A demonstration of the importance of an abundant natural prey base to wolf survival can be found in the examination of wolf–prey relationships in northwest Montana. White-tailed deer populations started to increase in the 1970s and remained high until the winter of 1996–97. Wolf numbers and distribution also expanded during this period.

Record hunter harvest in the fall of 1996, followed by one of the most severe winters on record, significantly decreased ungulate populations. This was followed by a corresponding increase in wolf depredation on livestock and subsequent wolf control. Conflicts between wolves and livestock during 1997 represented nearly 50 percent of all confirmed livestock depredations and lethal wolf control in northwestern Montana since 1987 (Bangs et al. 1998). Maintaining an adequate prey base should facilitate wolf recovery while decreasing depredation and control. Providing and sustaining sufficient prey base requires that ungulates be carefully managed and their habitats protected.

Evaluation of wolf management in the northern Rocky Mountains has shown that successful wolf recovery does not depend upon land use restrictions on private land due to the wolves' ability to thrive in a variety of land uses. There is little, if any, need for land use restrictions to protect wolves in most situations with the possible exception of temporary restrictions around active den sites on federal land. Additionally, the public is much more tolerant of wolf recolonization if the presence of wolves does not result in restrictive government regulations.

Hunting success and regulations are directly related to prey populations. One of the greatest concerns the public had with wolf reintroduction was the effect that wolves would have on deer, elk, and moose populations. The primary deterrent of the long-term status of gray wolf survival is human attitudes toward wolves (USFWS 2001). The hunting public has made substantial financial investments and sacrifices to restore ungulate populations to Montana (Sime 2002), and hunters can be a strong ally or opponent to wolf survival. Therefore, the refuge will best gain support for a healthy wolf population by maintaining ungulate populations and not restricting hunting unless in direct conflict with the survival of a wolf pack in the Pleasant Valley area.

Gray Wolf Objective 3

Prohibit livestock grazing when a wolf pack is present in Pleasant Valley to minimize conflicts with, and disturbance to, gray wolves.

Strategy

None.

Rationale

An experimental, radio-collar-triggered, light and siren device developed to keep wolves away from livestock was tested in the Bitterroot Valley of Montana in 1999. Tests were conducted in 2000 on three members of the Sheep Mountain pack that were killing cattle in the Paradise Valley of Montana. The wolves were captured and fitted with electronic training collars and released into a 1-acre pen. A calf fitted with a remote training system was placed in the pen with the wolves. The wolves were shocked if they came within 1 yard of the calf. Initial results were good, but the project is still in the research and development stages. More research on this and other aversive methods are planned in cooperation with USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services; the University of Montana; and the Turner Endangered Species Fund.

Conducting control on problem wolves has led to local rural residents readily contacting the Service or APHIS if they suspect they have wolf-caused problems. Without control in place, there will most likely be more illegal killings than the average of one per year presently (USFWS 1999c).

Tolerance of wolves by the local public reduces illegal killing of wolves and allows more opportunity for the public and the Service to investigate innovative ways to reduce wolf–livestock conflicts without killing wolves (such as aversive conditioning). In addition, it enhances communication between resource agencies and people who live near wolves, which leads to more accurate data gathering on wolf restoration efforts. All this ultimately increases the likelihood of successful wolf recovery in the region.

Gray Wolf Objective 4

To decrease human/wolf conflicts, work with the wolf recovery team to visit with at least 50 percent of neighboring landowners on a yearly basis to exchange wolf sightings and depredation information, and to educate landowners on the status of wolves and new aversion information and techniques.

Strategies

1. Coordinate with the wolf recovery team regarding new aversion techniques available to landowners in Pleasant Valley.

2. Use letters, phone calls, informational meetings, and door-to-door visits to educate and inform the public on the progress of wolf recovery and the development of livestock protection methods.

Rationale

Gray wolves are not only a source of wonderment to wildlife enthusiasts, but also a source of fear and concern for some of the landowners whose lands border or are near the refuge, especially to those persons whose livelihood is intrinsically tied to domestic cattle and sheep ranching. It is known that these carnivores are opportunistic and kill available animals as prey to survive and feed themselves and their young. Cattle and sheep have been killed by these carnivores in areas where all of these species coexist, such as in western Montana.

The Service is working with the state of Montana and with private citizens and private conservation groups to conserve these species and to minimize conflicts with private landowners. The conservation group, Defenders of Wildlife, has established a successful compensation program to indemnify cattle or sheep ranchers that suffer losses from wolf depredations to their stock. The Service is confident that this group will continue with their program.

An experimental, radio-collar-triggered light and siren device developed to keep wolves away from livestock was tested in the Bitterroot Valley of Montana. Tests were conducted in 2000 on three wolves that were killing cattle in the Paradise Valley. The wolves were captured and fitted with electronic training collars and released into a 1-acre pen. A calf fitted with a remote training system was placed in the pen with the wolves. The wolves were shocked if they came within 3.3 feet of the calf; initial results were good. More research with this and other aversion techniques are planned in cooperation with APHIS's Wildlife Services, the University of Montana, and the Turner Endangered Species Fund.

Conducting control on problem wolves has fostered local rural residents to readily contact the Service or APHIS if they suspect they have wolf-caused problems. Without control in place, there would most likely be more illegal killing than the average of one per year presently documented (USFWS 1999c).

Tolerance of wolves by the local public reduces illegal killing of wolves and allows more opportunity for the Service to investigate innovative ways to reduce wolf/livestock conflicts without killing wolves. Enhanced communication between resource agencies and people who live near wolves leads to more accurate data gathering on wolf restoration efforts. All of this ultimately increases the likelihood of successful wolf recovery.

Gray Wolf Objective 5

To educate the public and foster support for wolf recovery, the refuge's public use staff in collaboration with the wolf recovery team will have one interpretive field trip or workshop a year, and develop one interpretive display and one information sheet on the biology of wolves and their role in the Pleasant Valley ecosystem within 3 years of CCP approval.

Strategy

1. Collaborate with the wolf recovery team and the MFWP.

Rationale

The success of wolf recovery in Montana has as much to do with the relationship between wolves and people as it does with the ecology of the species (Sime 2002). Providing scientifically based, factual information will keep the public informed and will reduce misconceptions, rumors, and suspicions. Education and knowledge about the wolf will hopefully make the public more objective and less emotional about this species and its management.

Gray Wolf Objective 6

To protect private land from development and to conserve wildlife habitat, develop a conservation easement program encompassing the Pleasant Valley watershed within 3 years of CCP approval.

Strategies

1. Develop a conservation strategy with PCTC to protect their lands from future development.
2. Work with other conservation easement partners such as the NRCS's WRP, MFWP, Montana Land Reliance, The Nature Conservancy, and the Audubon Society.
3. Develop a preliminary project proposal delineating a focus zone and priority areas.
4. Seek funding from the Land and Water Conservation Fund.

Rationale

Because wolves and other large carnivores have large home ranges, attention should be focused on the habitat values of both public and private lands. Private lands, in particular have substantial value to wildlife because they frequently occur at low elevations with moderate extreme weather conditions such as deep snow. Voluntary habitat conservation efforts, such as land or vegetation management plans and conservation easements will ultimately benefit many wildlife species. (Sime 2002).

Farming and ranching in Montana maintains open space. That open space is also habitat for a diversity

of wildlife species. Maintaining the land base for agriculture and wildlife habitat is an increasing challenge, given broader trends in resource and agricultural economics, human population demographics, and development of the "New West" (Sime 2002).

Increasing settlement during the last century has significantly transformed the valley floors of northwest Montana. Large undeveloped tracts of agricultural lands and a complex of wildlands, wetlands, rivers, grassland, and forests are being converted to home sites such as "ranchettes" of 2–20 acres as the region's natural amenities attract new residents, vacation homebuyers, and businesses. This development trend has increased considerably in the last 20 years.

Flathead is one of the fastest-growing counties in Montana. Lack of planning and effective zoning has led to a highly fragmented residential development pattern. In 1999, 46 percent of new residential development in Flathead County occurred in rural areas.

The refuge is surrounded by large intact landownership. PCTC is a major landowner in the Pleasant Valley area. The state of Montana recently negotiated a conservation easement on PCTC lands in the Fisher River and Thompson River drainages in northwestern Montana. However, the PCTC is selling land surrounding Island Lake just west of the refuge. Much of the other private land in the valley is under the ownership of large family-owned ranches. Two of the ranches neighboring the refuge have already placed NRCS WRP easements on portions of their properties.

Pleasant Valley is located in a prime subdivision area with abundant wildlife, many lakes, and beautiful scenery and it is within easy commuting distance of Kalispell.

Canada Lynx Objective 1

Evaluate proposed management actions in Canada lynx habitats (forests and woodlands) prior to implementation and prohibit sport trapping of furbearers, to minimize negative impacts to Canada lynx habitat, and to prevent accidental death of Canada lynx.

Strategies

1. Restrict livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components in forests above 3,300 feet in elevation, for Canada lynx habitat.
2. Manage grazing in aspen stands to ensure sprouting and sprout survival in aspen stands above 3,300 feet elevation for Canada lynx habitat.
3. Manage riparian areas and willow stands to maintain or achieve midget condition or higher in areas above 3,300 feet elevation for lynx habitat.
4. Develop a fire management plan for forests above 3,300 feet in elevation that mimics natural fire regimes for Canada lynx habitat.
5. Prohibit precommercial thinning or clear-cutting of woodland Canada lynx habitat.
6. Prohibit sport trapping for the life of this CCP to prevent accidental death of Canada lynx.
7. Clearly post boundaries with appropriate Service signs.
8. Evaluate the effects that Canada lynx management will have on other priority species against the probability that lynx will benefit from the management activity or prohibition of such activity.
9. Patrol the area using the seasonal law enforcement position for the refuge, staff from the National Bison Range Complex, and MFWP wardens.
10. Hire a biologist to coordinate and monitor lynx activities.

Rationale

Although the Canada lynx will be considered in management decisions, the refuge contains only marginal habitat for lynx and even intensive management for lynx habitat on the refuge may not result in lynx using the refuge. Therefore, when conflicts arise, the needs of the lynx may not be the primary consideration in habitat management. However, Section 7 of the ESA (50 CFR 402) requires that federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. While a critical habitat designation is warranted, critical habitat has not been designated for the lynx. Thus, the refuge should evaluate all management decisions in forest stands above 3,300 feet to ensure that lynx habitat is not adversely modified.

Lynx habitat in the Rocky Mountains consists of two structurally different forest types. Lynx require early successional forests that support high densities of snowshoe hare and late-successional forests that contain cover for kittens and for denning.

Timber harvest and related activities in forests have the greatest potential to affect lynx habitat. Timber harvest and associated forest management can be benign, beneficial, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the vegetation potential of the site. Timber harvest can result in reduced cover, unusable forest openings, and large monotypic stands with sparse understories that are unfavorable for lynx and snowshoe hare.

Precommercial thinning also reduces snowshoe hare habitat by reducing cover. Forestry practices can benefit lynx when they result in understory stem densities and structure that meets forage and cover needs of snowshoe hare. Snowshoe hare densities are highest in regenerating stands with very high stem densities. Regeneration harvest can be used to create quality snowshoe hare habitat, especially where natural regeneration would be expected to provide dense, young vegetation (Hodges 1999a, 1999b; Ruggiero et al. 1999).

Although disease and insect attacks may increase fuel loads and the risk of large, high-intensity fires, they also provide dead and downed trees used for denning and cover. Thus, the role that disease and insects play in the dynamics of forest being manipulated must be carefully considered when managing stands for timber and lynx.

Although lynx trapping is currently prohibited in Montana, lynx can be inadvertently trapped in other predator sets. It is not always possible to release a nontarget species from a trap unharmed. Human-caused mortality is believed to be additive in low-density lynx populations characteristic of the southern boreal forests (Koehler 1990). Therefore, illegal or incidental harvest can significantly reduce population numbers of lynx in southern regions.

Canada Lynx Objective 2

Identify potential denning and foraging habitat and topographical features important to Canada lynx movement; maintain denning habitat in patches generally larger than 5 acres on at least 25 percent of the denning area above 1,000 meters in elevation; and maintain habitat connectivity; within 10 years of CCP approval, to enhance habitat for lynx.

Strategies

1. Identify Canada lynx habitat by ground truthing areas identified as mature forest through vegetative classification mapping.
2. Determine snowshoe hare populations on the refuge and surrounding lands to evaluate the potential of lynx occupation.
3. Measure current woody debris and analyze the potential for lynx denning sites.
4. Identify and designate suitable habitat for snowshoe hare near lynx denning habitat.
5. Provide prey for Canada lynx by managing for snowshoe hare habitat; identify areas of forest above 3,300 feet in elevation to manage in an early successional stage with dense understory.
6. Provide prey for Canada lynx by maintaining long-term habitat for snowshoe hare; identify suitable habitat on neighboring PCTC lands and coordinate with timber managers to maintain habitat.
7. Maintain habitat connectivity by managing for intermediate successional stages in forest habitats between lynx foraging and denning habitat.
8. Keep natural fires from spreading off-refuge by creating firebreaks, if necessary, in habitat for Canada lynx.
9. Protect lynx denning cover by creating firebreaks to prevent natural fire from spreading in or out of areas where fuels have built up in areas managed for Canada lynx denning.
10. Hire a biologist to coordinate and monitor lynx activities.

Rationale

Late-successional mature forests that contain large, woody debris such as fallen trees or upturned stumps are required habitat for lynx denning (Berrie 1973, Koehler 1990, Koehler and Brittel 1990, Kesterton 1988, Murie 1963). Small-sized parcels (2.5–5 acres) of late-successional forest appear to be adequate for den sites, but these parcels must be connected by corridors of cover to permit females to move kittens to alternate den sites providing suitable access to prey. Several areas of habitat suitable for denning are required to ensure that habitat remains in the event of an uncontrollable natural process such as destruction of habitat due to wildland fire.

Early successional forests where snowshoe hare are plentiful are favored hunting habitats for lynx. Such forests result from fires (Bailey et al. 1986; Fox 1978; Keith and Surrendi 1971; Koehler 1990, 1991), timber harvest (Conroy et al. 1979; Koehler 1990, 1991; Litvaitis et al. 1985), or windthrow and disease (Koehler and Brittell 1990). Based on hare pellet counts in Washington, Koehler (1990) found that hares were more abundant in younger-aged stands of lodgepole pine than in any other forest type. Studies strongly indicate that conifer cover is critical for hares during the winter. Hares are more likely to use young stands with dense understory than uncut or even-aged stands with little understory (Monthey 1986; Thompson 1988; Koehler 1990).

Although early successional forests are common habitat on surrounding PCTC lands, these stands may not be managed to support the dense understory that is required for high snowshoe hare populations. For instance, precommercial thinning is detrimental to snowshoe hare habitat but is a common management tool on productive timberlands. Staff should consult with PCTC biologists to determine snowshoe hare habitat on surrounding lands and then determine what will be required on refuge lands to support lynx in the Pleasant Valley ecosystem.

Canada lynx are specialized predators adapted to northern latitude and high-elevation habitats with abundant winter snows. Snowshoe hare are the lynx's primary prey, comprising 35–97 percent of their diet (McCord and Cardoza 1982). Conclusions from the "Ecology and conservation of lynx in the United States" are that a snowshoe hare density greater than 0.5 hares per hectare (0.2 hares per acre) is required for lynx (Ruggiero et al. 1999).

Bald Eagle Objective 1

To enhance recovery of the bald eagle in Montana, eliminate disturbance and protect habitat within 0.5 mile of any occupied bald eagle nest, until the bald eagle is delisted and for 5 years thereafter.

Strategies

1. Monitor bald eagle nest success to ensure that breeding areas have at least 65 percent nest success, and at least five young fledged during the preceding 5 years.
2. Submit the annual bald eagle nest survey form to the appropriate state authorities.
3. Evaluate all management decisions for their effects bald eagles prior to implementation to ensure that preferred nesting and feeding habitat characteristics are maintained.
4. Allow existing levels of human activity if the bald eagle breeding area has at least 65 percent nest success, and has fledged at least five young during the preceding 5 years.
5. Limit disturbance to bald eagles by restricting construction of permanent developments such as kiosks, parking areas, and trails that may increase human activity within 0.5 mile of an occupied bald eagle nest or area with prime nesting potential.
6. Allow high-intensity activities outside the nesting season for bald eagles.

Rationale

An occupied eagle nest site is any site with recorded activity of breeding within 5 years. One of the preferred planning options in the Montana Bald Eagle Management Plan (MBEWG 1994) is nest site management zones. These zones are concentric circles around each nest site in which different management options are applied. Zone I extends 0.25 mile from the nest site in a concentric circle and is defined as the "nest site area." In this area, human activity or development may cause the abandonment or lower the productivity of the breeding area.

Zone II extends from 0.25 to 0.5 miles from an occupied nest site. This area is defined as the "primary use area" and is where 75 percent of a breeding pair's activity (foraging, loafing, and bathing) occurs.

Bald eagles are sensitive to human disturbance, especially activity after nest initiation and prior to fledgling. This activity can result in decreased nestling survival (Steidl and Anthony 1996). After hatching, eagles are less sensitive to disturbance and are less likely to abandon or neglect young.

Lost Trail is a national wildlife refuge and, as such, is held to higher standards where endangered species are concerned. Although the Montana Bald Eagle Management Plan guidelines permit minimal disturbance in zone II, the refuge will extend zone I guidelines to 0.5 mile.

In management zones I and II, habitat alteration (such as timber harvest, prescribed fire, power line construction, pesticide use, land clearing, levee or dam construction, and wetland drainage) that may negatively affect the breeding and foraging area of bald eagles should be evaluated prior to implementation.

Guidelines developed by the bald eagle recovery team (USFWS 1986) recommend a goal of at least one fledged per year on average per nesting pair and an average nest-success rate of not less than 65 percent over a 5-year period.

Nest site monitoring is an important tool in determining population trends of many bird species. The bald eagle nest survey form is designed to standardize raptor nesting data collection and is valuable in tracking progress toward the delisting of the bald eagle. The Montana working group coordinates the annual survey, and compiles and evaluates the results.

Bald Eagle Objective 2

To maximize the potential for nesting of the bald eagles on the north shore of Dahl Lake and the continued existence of nesting bald eagles on the refuge, maintain a mature forest stand comprised of aspen, Douglas-fir, ponderosa pine, or mixed conifers with low to moderate canopy cover, of at least 20 acres within 1 mile of Dahl Lake; the stand will contain at least two suitable nest trees and at least three perch trees.

Strategies

1. Maintain the bald eagle habitat (aspen stand) on the north shore of Dahl Lake in a healthy productive condition through the use of fencing, cattle grazing, flooding, prescribed fire, and protection from beavers.

2. Evaluate the potential for aspen and conifer stands around Dahl Lake to provide habitat for nesting bald eagles; apply appropriate management techniques.

Rationale

Montana bald eagle working group (1991) characterized quality habitat as a mature forest stand of low to moderate canopy closure consisting of cottonwood, Douglas-fir, ponderosa pine, or mixed conifer. Forest stands with nest sites should be 20 acres or larger and be located within 1 mile of open water. The stand should contain at least two suitable nest trees (older, large-diameter trees) and more than three perch trees. Feeding habitat should be greater than 80 acres with shallows, grasslands, and meadows intermixed.

Bald Eagle Objective 3

Maintain suitable, bald eagle foraging habitat, minimize disturbance within key areas, and maintain the integrity of the breeding area between 0.5 and 1 mile of any occupied eagle nest until the bald eagle is delisted and 5 years thereafter, to enhance bald eagle recovery.

Strategies

1. Delineate and protect key use areas of bald eagles (foraging and perching) to limit disturbance.
2. Design habitat alterations to ensure that prey base and important habitat components such as perch trees are maintained or enhanced for the bald eagle.
3. Protect bald eagles by evaluating proposed pesticide use before application.
4. Design and regulate permanent developments such as viewing areas, trails, parking lots, and kiosks to minimize disturbance and avoid conflict with key use areas for the bald eagle, between 0.5 and 1.0 mile of an active nest.
5. Monitor the effect on bald eagle use of any recreation permitted in the primary nesting zone.

Rationale

Zone III in the Montana Bald Eagle Management Plan guidelines represents most of the home range used by eagles during the nesting season. It usually includes all suitable foraging habitats within 2.5 miles of all nest sites in the breeding area that have been active within 5 years.

The management goal for Montana is to facilitate population growth until the number of breeding pairs peaks. After that, the management goal is to provide secure habitat to maintain a healthy self-sustaining population as close to peak levels as possible (MBEWG 1994b). Secure habitat includes all area within 0.5 mile of a nest and key use areas within 2.5 miles of a nest site. Disturbance and habitat modifications in zone III could lead to the disruption of nesting or a decrease in nestling survival.

Bald Eagle Objective 4

Remove carrion from roadsides immediately upon notification, limit shooting and trapping, and restrict the use of pesticides; evaluate power lines and reduce associated hazards within 5 years of CCP approval, to minimize direct mortality to bald eagles.

Strategies

1. Follow the hunt plan (2002) that limits hunting to deer, elk, moose, turkey, and grouse and designates a closed area in which the existing bald eagle nest is located.
2. Prohibit sport trapping.
3. Protect bald eagles by evaluating proposed pesticide use before application.
4. Hire a biologist to evaluate or facilitate the evaluation of the effects of existing power lines on bald eagles.

Rationale

Eagles are attracted to carrion. If carrion exists along a road, eagles become vulnerable to oncoming traffic. This is especially true when the eagle is gorged and during the winter when ambient temperatures are below freezing and wind is calm (MBEWG 1994b).

Power lines and poles pose an electrocution and collision threat to eagles. Existing power lines can be modified to reduce the danger to eagles and other migratory birds. New power lines should be evaluated to minimize affects on eagles.

Eagles are vulnerable to leg-hold traps near site baits. They can be caught in these traps and sustain severe injury or death.

Trumpeter Swan Objective 1

Annually monitor trumpeter swan migration and nesting in the Pleasant Valley ecosystem, and protect nesting swans on the refuge from human disturbance from time of arrival until cygnets have fledged, to assist in trumpeter swan conservation.

Strategies

1. Monitor for trumpeter swans during routine duties including duck pair and brood counts.
2. Provide lookouts during the swan migration and nesting season; seek assistance from Flathead Audubon volunteers.
3. Annually compile sightings and habitat use data for trumpeter swans in Pleasant Valley area; coordinate through neighboring landowners, MFWP, PCTC, and USDA Forest Service.

4. Limit public access in the trumpeter swan-nesting area, depending on nest site location.
5. Use signs to post trumpeter swan-nesting areas closed to public use; develop interpretive material to explain closures.

Rationale

Trumpeter swans are occasionally observed on Island and Flathead lakes, and various other locations in northwestern Montana. The Flathead Valley is one of three areas where suitable habitat existed and trumpeter swans were once a common breeding species in the United States. (Banko 1960)

One of the greatest threats to trumpeter swan survival in the RMP is that the swans concentrate in local wintering areas where food resources are becoming scarce and where they are at a greater risk of disease outbreaks. Locations of swans in areas outside of the Yellowstone–Idaho area should be reported to the trumpeter swan working group, as these swans may be pioneers that could establish new breeding and wintering grounds.

Nesting trumpeter swans have been shown to be sensitive to human disturbance during the nesting season. Birdwatching, 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).

Trumpeter Swan Objective 2

Reintroduce trumpeter swans to the Fisher River watershed if suitable habitat is available, within 10 years of CCP approval, to restore trumpeter swans to unoccupied, historical breeding habitat and encourage broader winter distribution.

Strategies

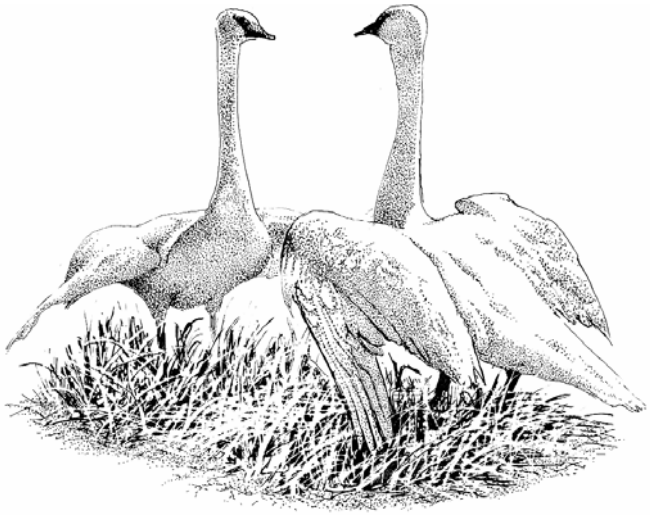
1. Evaluate Dahl Lake's suitability to sustain a healthy, reproducing population of trumpeter swans; evaluate emergent vegetation and aquatic invertebrates in the lake.
2. Evaluate threats to swan-nesting success such as snapping turtles, lead shot, and power lines; reduce threats where possible.
3. Implement the habitat development plan to benefit trumpeter swans: (1) maintain or increase the current amount of emergent vegetation; (2) maintain water depths below 4 feet over extended areas; and (3) maintain stable water levels during the swans breeding season.
4. Introduce trumpeter swan cygnets and yearlings to area lakes and wetlands to reestablish nesting trumpeter swans in the Fisher River watershed; collaborate with the Trumpeter Swan Working Group and CSKT.
5. Provide relatively disturbance-free swan-nesting areas.
6. Discourage sedentary swan flocks and prohibit supplementary feeding.
7. Develop monitoring protocols for trumpeter swan restoration efforts.

Rationale

Trumpeter swans are long-lived, social birds that are highly dependent on strong family bonds and traditional patterns of habitat use that are passed down through generations (USFWS 1995a). When swans were eliminated from much of their range, they not only lost a major segment of the population but perhaps of greater importance, they lost flyway traditions.

Today, the majority of trumpeter swans in the RMP concentrate on a small number of wintering grounds. Severe losses could occur from disease outbreaks, severe winter weather, and lack of forage. In 1989, more than 100 swans died in the tri-state area when a blizzard swept through a major wintering area. Since then, winters have been mild, but the possibility of another hard winter always exists.

As the swan population increases, the limited resources in the area are taxed and may not recover to provide forage for the next year. It is important to the survival of the RMP to relearn and rebuild migratory patterns that were lost when swans were exterminated from much of their range. Historical accounts indicate that the Flathead Valley was once a major nesting area for swans. In recent times, there have been sporadic reports of swans wintering in northwestern Montana along the Flathead River and Clark Fork River drainages.



Trumpeter Swans
Bob Savannah/USFWS

Trumpeter swans have also been observed during migration and a pair was documented in the Pleasant Valley area one summer but breeding was not recorded. The ultimate goal is to reacquaint trumpeter swans with wintering grounds, breeding areas, and migratory routes that were lost when the population neared extinction in the early 1900s. This will be accomplished through natural pioneering and through transplant of swans to suitable habitat.

Important requirements for successful breeding of trumpeter swans include the following:

- room for take off (approximately 328 feet)
- accessible forage
- shallow, stable levels of unpolluted, fresh water
- emergent vegetation, muskrat island, or other structure for nest site
- low human disturbance
- highly irregular shorelines
- water depth of less than 3.9 feet
- abundant and diverse communities of aquatic plants
- abundant invertebrate populations

(Mitchell 1994, Hansen et al. 1971, Maj 1983, Squires 1991, Lockman et al. 1987)

Black Tern Objective 1

Annually monitor the number of nesting black terns, and monitor the tern's nesting and foraging habitat through the period of wetland restoration and enhancement to determine if emergent vegetation is provided at levels and densities equivalent to or above current levels (80 acres of palustrine, emergent, semipermanent, and flooded vegetation), with a water-to-emergent-vegetation ratio between 25 and 75 percent (as close to 50 percent as possible), and water depths between 0.5 and 1.2 meters at the emergent-vegetation/open-water interface, to establish baseline data for management decisions, and contribute to statewide conservation of black terns.

Strategies

1. Monitor for number of black tern adults present, number of nests, and nest success using volunteers, interns, or refuge staff.
2. Ensure refuge-specific data about black terns are included in statewide information; coordinate through MFWP.
3. Survey for presence, abundance, and nesting activity of black terns on Dahl Lake to determine the nesting population associated with current levels of emergent vegetation.
4. Monitor black tern nesting response to changes in water levels of Dahl Lake during implementation of the habitat development plan and other management activities.
5. Determine the effects of wetland development on black tern habitat by doing pre- and postactivity measurements of vegetation response and water depth in emergent-vegetation areas adjacent to open water; map acreages of emergent vegetation and open water in the GIS.

Rationale

Black terns have shown continent-wide population decline since 1960 and are listed as threatened or endangered in six states. They are listed as a species of concern in 18 other states and provinces (Casey 2000). Black terns are listed as a Service nongame bird of management concern (USFWS 1995b, 2002). In Montana, black tern is listed as a species of special concern with a ranking of vulnerable under the Natural Heritage Program classification system (Shuford 1999), but has not been consistently monitored.

Declines are probably related to a loss of wetlands and a decrease in food supply, in part, caused by insect control (Dunn and Agro 1995). Black tern populations are difficult to quantify on an ecosystem level because black terns exhibit low site fidelity. Loss of potential nesting and foraging habitat for black terns is greatest in northeastern and northwestern Montana.

To evaluate the status of black terns in Montana, individual agency records need to be compiled and evaluated. The MFWP documented tern production on the refuge in 1999. Refuge staff observed terns in 2000 and 2001. Restoration and enhancement of refuge wetlands may affect tern nesting.

Black terns nest in shallow, freshwater wetlands in emergent vegetation. They prefer wetland complexes greater than 20 hectares (49.4 acres), in areas with 25–75 percent of the surface covered with emergent vegetation, water depths between 0.5 and 1.2 meters (1.6 and 3.9 feet), and nesting substrate within 0.5 and 2 meters (1.6 and 6.6 feet) of open water (Dunn and Agro 1995). Nests are often lost to bad weather, effects of winds and waves, and changing water levels. Known predators include great horned owl, mink, northern harrier, ring-billed gull, American crow, common raven, raccoon, muskrat, long-tailed weasel, otter, and snapping turtle (Gerson 1988, Novak 1992, Dunn and Agro 1995). Nest success will be monitored to document production.

Degradation of lake habitat may occur by succession, raising or lowering water levels, introducing exotic species, and reductions in water quality (Novak 1992). Nest platforms can be flooded out by rising water levels. Low water levels may increase likelihood of nest predation by mammals. Black terns may shift breeding sites from year to year in

response to changes in hydrologic cycles and emergent vegetation (Shuford 1999). In most cases, WPA managers can provide suitable nesting habitat for black terns without any major changes to their water management (Casey 2000).

Boreal Toad Objective 1

Assess the impacts that implementing the habitat development plan will have on the boreal toad population prior to wetland manipulation in those areas documented in 2001–2003 as breeding areas for this species.

Strategies

1. Locate breeding sites for boreal toads (Hossack et al. 2001).
2. Cross reference boreal toad sites against the habitat development plan to determine needed changes.
3. Determine what effects implementing the habitat development plan may have on the boreal toad, in collaboration with amphibian and reptile biologists.
4. Determine methods of wetland restoration and management that have the least adverse effect on boreal toads.

Rationale

Hossack et al. (2001, 2003) found evidence of boreal toads breeding on 5 of 20 sites surveyed in 2001 and 15 of 28 sites in 2002. Boreal toads were located at less than 5 percent of other forested sites surveyed in Montana since 1999.

Dahl Lake has the largest reproducing population known for the Rocky Mountains (based on the number of larvae observed). There is a concern that this species is declining in the region. Evidence from Glacier National Park and the refuge show that breeding sites are often clustered in a small area, hence are at risk to environmental changes for local extinction.

The development of water impoundments or any change in water manipulation or water levels can result in the loss of key breeding, overwintering, and foraging habitats for herpetofauna. Water impoundments that are developed for waterfowl production may lead to a decline in reptiles and amphibians through increased depredation from a high concentration of waterfowl.

A high concentration of waterfowl can also lead to a decrease in water quality. At Bosque del Apache National Wildlife Refuge in New Mexico, waterfowl increased nitrogen levels by 40 percent and phosphorus levels by 75 percent in the winter of 1995–96 (Post et al. 1998). Amphibians have highly permeable skin and egg membranes and complex life cycles.

Many species are philopatric to specific breeding, foraging, and overwintering habitats. With such an important locally breeding population and possibly an important regional breeding population, refuge management and wetland restoration projects should be carefully examined for the potential impacts to this species.

Spalding's Catchfly Objective 1

Maintain Spalding's catchfly populations in suitable upland grasslands (minimum population of 350 plants), and inventory 10 percent of suitable habitat each year until all suitable habitat has been evaluated, to protect Spalding's catchfly and provide unique opportunities for visitors to learn about threatened plants.

Lindy Garner/USFWS

A healthy cluster of the threatened Spalding's catchfly grows on the refuge.

Strategies

1. Maintain native Palouse prairie habitat in and around the Spalding's catchfly site with sufficient native forb composition to attract, but not compete for, pollinators.
2. Maintain a robust native plant community using prescribed fire.
3. Coordinate and collaborate with Montana DNRC to maintain Spalding's catchfly plants.
4. Protect Spalding's catchfly sites from trampling and grazing.
5. Monitor Spalding's catchfly sites for insect damage and apply adaptive management to protect plants.
6. Monitor all Spalding's catchfly populations on the refuge to determine population trend.
7. Search suitable habitat for Spalding's catchfly plants using volunteers from local schools, Montana Native Plant Society, and Landmark Volunteers.
8. Report locations of Spalding's catchfly populations to the Montana Natural Heritage Program.

9. Conduct site evaluations for habitat characteristics of Spalding's catchfly better to manage present and other potential sites of suitable habitat.
10. Develop interpretive material about Spalding's catchfly to educate the public on identification of the plant, its habitat requirements, and why the plant is endangered.

Rationale

Spalding's catchfly is a native forb of the carnation family (Caryophyllaceae) that occurs in mesic slopes, flats, or depressions of open grasslands. It is associated with Idaho fescue, rough fescue, and bluebunch wheatgrass. The catchfly is occasionally interspersed with conifers.

Twenty populations have been documented in northwestern Montana in the following counties: Flathead (6), Lake (2), Lincoln (6), and Sanders (6). A new population was discovered on the refuge in 2002. This population is one of the largest documented sites in Montana and contains a minimum of 300 plants within about 9.5 acres. Part of this population exists on Montana DNRC land within the legislative boundary of the refuge. The staff is certain more plants will be discovered as inventory efforts continue.

Federal law requires that endangered species be protected and, if possible, restored on federal lands. The refuge has up to 2,500 acres of Idaho fescue- and rough fescue-dominant habitat that could support Spalding's catchfly. Since there are only 53 known populations of Spalding's catchfly in fragmented populations across the northwest, the relatively large population located on the refuge and any new populations that may be discovered are significant to the plant's survival.

Threats to Spalding's catchfly include grazing and trampling by domestic livestock and native herbivores, herbicide treatment, competition from nonnative plants, and competition from pollinators. Prescribed fire may have a positive effect on Spalding's catchfly by removing litter or duff layers and woody plants, thus improving natural propagation of the plant. Recruitment of Spalding's catchfly was enhanced following prescribed fire in Montana (Lesica 1992, 1999). The effects of fire would vary, depending on fuel moisture, species composition, season, and intensity of burning (Lesica 1997). Prescribed fire may also increase invasive nonnative plant populations, which may negatively affect on Spalding's catchfly. Therefore, prescribed fire may enhance Spalding's catchfly survival and recruitment but must be thoroughly evaluated prior to use.

Although there is a federal responsibility to maintain this threatened plant population, its location on a national wildlife refuge provides unique possibilities for environmental education and interpretation. Careful planning could present opportunities in the future for guided tours to view the plant and learn about its habitat characteristics and threats to its continued existence. Visitors could help locate new populations while out hiking or hunting, if they are exposed to preliminary information in the visitor contact station.

Spalding's Catchfly Objective 2

Inventory for Spalding's catchfly prior to any management actions to prevent destruction of Spalding's catchfly plants or adverse modification of its habitat.

Strategies

1. Monitor Spalding's catchfly from mid- to late July when flowers are in bloom using walk-through surveys.
2. Locate and map sites of Spalding's catchfly using global position system (GPS) technology.
3. Coordinate and collaborate with the Montana DNRC to maintain Spalding's catchfly.
4. Evaluate short-term, long-term, and cumulative effects of management actions (e.g., invasive plant control and prescribed fire) on maintenance and restoration of Spalding's catchfly.

Rationale

Same rationale as for objective 1.

Management tools such as prescribed fire and invasive plant control would benefit the catchfly as long as careful attention is given to implementation. Management tools such as grazing, prescribed fire, and spraying may adversely affect Spalding's catchfly populations, even though they could also be critical to its continued existence. A burning program at the wrong time of year or in an area subject to more invasive plant encroachment could create a disadvantage for the catchfly.

Invasive plant control is important because invasive plants displace and compete with the catchfly (Delphey and Rey-Zizgirdas 2001). However, herbicide application has to be carefully applied at the right time of year and not in the location of plants to not damage the catchfly. Federal law prohibits modification of critical habitat, and any act that may jeopardize the continued existence of a listed species. Prior to implementation of any management actions that may affect Spalding's catchfly, a survey must be conducted to determine if this species is in the management area. If the species is located, refuge staff will evaluate the effect that implementing the management action would have on the plant and develop the best management practice.

Spalding's Catchfly Objective 3

Annually control invasive plants around any Spalding's catchfly population that has a minimum of 20 plants, until survey shows there are no invasive plants within a 100-meter buffer, to maintain and increase Spalding's catchfly populations.

Strategies

1. Inventory all suitable habitats within the legislative boundary of the refuge for the presence of Spalding's catchfly.
2. Map invasive plant populations within and around all Spalding's catchfly populations.
3. Use hand pulling, hand spraying, and all-terrain vehicles (ATVs) for herbicide application in areas within 330 feet of Spalding's catchfly populations.
4. Establish a list of volunteers that are willing to help inventory for Spalding's catchfly or control invasive plants in catchfly habitat.

Rationale

Same rationale as for objective 1.

Invasive plants displace Spalding's catchfly and compete with it for water, nutrients, light, and pollinators (Delphey and Rey-Zizgirdas 2001, Montana Natural Heritage Program 1998). Many locations of Spalding's catchfly are at risk of being displaced by nearby populations of invasive plants, especially spotted knapweed and sulfur cinquefoil. Herbicide use to control invasive plants may also harm the catchfly. An integrated pest management program should be evaluated including hand pulling, hand spraying, and biological control to reduce encroaching invasive plants while not harming the catchfly.

CULTURAL RESOURCES

Archaeological and historical resources, as well as traditional uses, are addressed in the management direction for cultural resources.

GOAL

Protect, manage, and interpret archaeological, cultural, and historical resources present at Lost Trail National Wildlife Refuge for the benefit of present and future generations.

Cultural Resources Objective 1

To preserve resources for all Americans and comply with applicable laws and legislation, maintain and protect documented cultural and historical resources for the life of this plan.

Strategies

1. Work with Region 6's archaeologist to develop and perform a formal review of documented resources every 5 years to ensure protection, evaluation of condition, and preservation.
2. Survey for cultural resources before doing developments and restoration activities.
3. Use the most up-to-date techniques for surveying, documentation, preservation, restoration, and research through coordination with Region 6's archaeologists, Montana State Historical Preservation Office (SHPO), the CSKT THPO, and local scholars and experts.
4. Accommodate access to and ceremonial use of sacred sites by religious practitioners of recognized Native American tribes in accordance with policy.
5. Provide one half-time law enforcement officer to enforce laws and regulations to protect cultural resources.
6. Provide one full-time and one part-time maintenance staff to prevent damage and deterioration of resources.

Rationale

It is the policy of the Service to identify, protect, and manage cultural resources located on Service lands and affected by Service undertakings, in a spirit of stewardship, for future generations. Specifically, the Service will manage these resources in such a manner that sites, buildings, structures, objects, and values of importance are sufficiently protected for present or future scientific study, public appreciation, and socio-cultural use.

The historical and cultural foundation of the Nation should be preserved as a living part of community life and development in order to give a sense of orientation to the American people and a spirit of stewardship for the inspiration and benefit of present and future generations. The preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans.

There are a variety of laws in place that provide direction and legalities, including the Archaeological Resources Protection Act (ARPA), the Archaeological and Historic Preservation Act, the Historic Sites, Buildings and Antiquities Act, and the National Historic Preservation Act (NHPA).

The integrity of cultural resources located on Service lands is subject to threats from erosion, neglect, vandalism, grazing, cultivation, and other land-disturbing activities. The Service is required by statute to exercise caution in carrying out its

activities to assure that historical properties are not inadvertently sold, demolished, substantially altered, or allowed to deteriorate significantly without adequate review and protection.

Many of the laws that regulate management of cultural resources on Refuge System lands are concerned with avoiding or mitigating impacts to these resources during the planning of and implementation of projects. There are stipulations to stop projects if objects or sites are uncovered during work. Even though the refuge works with partners with expertise in cultural and historic fields, staff involved with planning and implementing projects should have enough training to recognize potential sites to minimize damage to resources.

Refuge projects will need to include trained personnel (whether on staff, the Service's Region 6 archaeologist, or its contractors) who will check sites prior to and during implementation so as not to damage cultural or historical resources. While this will add to costs, it is required by law. It will also provide documentation of any new sites and resources uncovered.

Cultural Resources Objective 2

Survey all refuge lands for cultural resources, within 15 years of CCP approval, to preserve resources for all Americans and comply with applicable laws and legislation.

Strategies

1. Use the most up-to-date techniques for surveying, documentation, preservation, restoration, and research through coordination with Region 6's archaeologists, Montana SHPO, the CSKT THPO, and local scholars and experts.
2. Provide one full-time public use specialist to be trained to coordinate cultural resource surveys in cooperation with Region 6's cultural resources personnel.

Rationale

Several laws require or encourage active surveying for cultural and historical resources, to minimize damage and deterioration to sites and to preserve them for future generations.

The NHPA is the primary piece of legislation that compels government agencies to protect and preserve cultural resources that are eligible for the National Register of Historic Places. NHPA requires federal agencies:

> to consider the effects of agency projects on federal lands;
>
> to minimize damage to cultural resources on federal lands;
>
> to survey federal lands for cultural resources.

Cooperation between the Montana SHPO, the THPO, and the Service will be needed to ensure that surveys of resources by the Service's Region 6 archaeologist or its contractors are comprehensive.

The preservation of historical heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans.

Minimum staffing guidelines for the refuge call for law enforcement and public use personnel. If provided, these can be available to coordinate documentation, protection, and interpretation of cultural resources. Basic facilities and support provided for other management programs (such as office space, computers, and vehicles) can also be used to support management of cultural and historical resources.

By actively seeking and documenting as many sites as possible at the refuge, managers can develop plans that will avoid as much damage as possible to the resources. This will also save time and money by eliminating or modifying projects that would have to be delayed, redesigned, or stopped if a cultural or historical site were uncovered during the undertaking.

Cultural Resources Objective 3

Develop an outreach program to educate the public about cultural and historical aspects of the refuge and foster support and understanding of the management program to protect sensitive aspects of these resources, within 5 years of CCP approval.

Strategies

1. Develop a resource library of information about cultural and historical sites on the refuge.
2. Work with Region 6's archaeologist and education and visitor services staff to develop interpretive and educational products.
3. Distribute outreach materials for cultural resources in collaboration with local schools, colleges, and civic groups.
4. Develop programs for the public to experience cultural resources with limited direct contact, e.g., access to photographs and replicas vs. actual site visits.
5. Provide one full-time public use specialist to develop cultural resource materials to distribute to the public.

Rationale

The ARPA requires land-managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation. However, refuge managers should understand that these sites are sensitive, and allowing uncontrolled access by the public to them is unacceptable.

Refuge managers must ensure the physical integrity of the sites, including maintaining appropriate location confidentiality. These resources are increasingly endangered because of their commercial attractiveness and education is a way to encourage compliance with rules and regulations and increase protection.

PUBLIC USE

Priority public uses (wildlife-dependent recreational uses) are addressed in the following management direction for public use. Priority uses are listed here:

- hunting
- fishing
- wildlife observation
- wildlife photography
- interpretation
- environmental education

Locations of public use and facilities are displayed in figure 12.

The definition of authorized access (foot travel, snowshoes, skis, mountain bikes, horses) will be determined in the appropriate step-down plan(s).

GOAL

Provide quality wildlife-dependent recreational and educational opportunities for persons of all abilities to learn, understand, and enjoy the Intermountain ecosystem of northwestern Montana; the associated fish, wildlife, and plants of Lost Trail National Wildlife Refuge; and the National Wildlife Refuge System in a safe and compatible manner.

Public Use Objective 1

Develop a demographic profile of wildlife-dependent recreational users (users within a 2-hour commuting radius) within 2 years of CCP approval, to determine the long-term direction to provide for quality, public use opportunities.

Strategies

1. Collaborate with Region 6's staff in education and visitor services (EVS).
2. Provide one full-time public use specialist to work with EVS staff and the Office of Management and Budget to develop a demographic profile of current and future refuge visitors.
3. Obtain information on wildlife-dependent recreational users visiting the area, in coordination with MFWP, Flathead County Travel Board, Kalispell and Libby Chambers of Commerce, and the Institute for Tourism and Recreation Research (University of Montana).
4. Develop partnerships with local angler and hunting groups such as Trout Unlimited, Ducks Unlimited, and RMEF to learn of fishing and hunting use in the area, access needs, and sport fishery and hunting goals.
5. Determine environmental educational needs and student numbers within a 2-hour travel radius through collaboration with local schools, including Flathead Valley Community College and the University of Montana's Yellow Bay Biological Station.
6. Work with local environmental education groups, including Flathead Chapter of the Audubon Society, Glacier Institute, Swan Ecosystem Center, and Crown of the Continent Ecosystem Education Consortium to determine what they offer and whom they serve.
7. Develop partnerships with local wildlife groups such as Flathead Chapter of the Audubon Society and photography clubs to gather information on member use of local wildland areas for wildlife observation and photography.
8. Work with MFWP, Glacier National Park, Flathead National Forest, and the CSKT to determine what they offer and whom they serve.

Rationale

Wildlife-dependent recreational public use—hunting, fishing, wildlife photography and observation, interpretation, and environmental education—are great means of fostering understanding and instilling an appreciation of native fish, wildlife, and plants and their conservation. They are also part of the priority wildlife-dependent public uses designated in the Improvement Act.

Because Lost Trail is a new refuge, there is limited background on what the public wants and expects from the refuge. It needs to be determined which opportunities can be offered that would provide quality experiences, that would be used by and attract visitors, and that would complement and enhance opportunities provided by the private sector or other agencies.

Public Use Objective 2

Develop and implement a visitor service plan within 2 years of CCP approval, to provide the highest quality wildlife-dependent recreational opportunities.

Strategies

1. Collaborate with Region 6's staff in EVS.
2. Conduct a formal visitor services requirement evaluation with Region 6's EVS staff to determine if the visitor service plan has been met and to determine future needs.

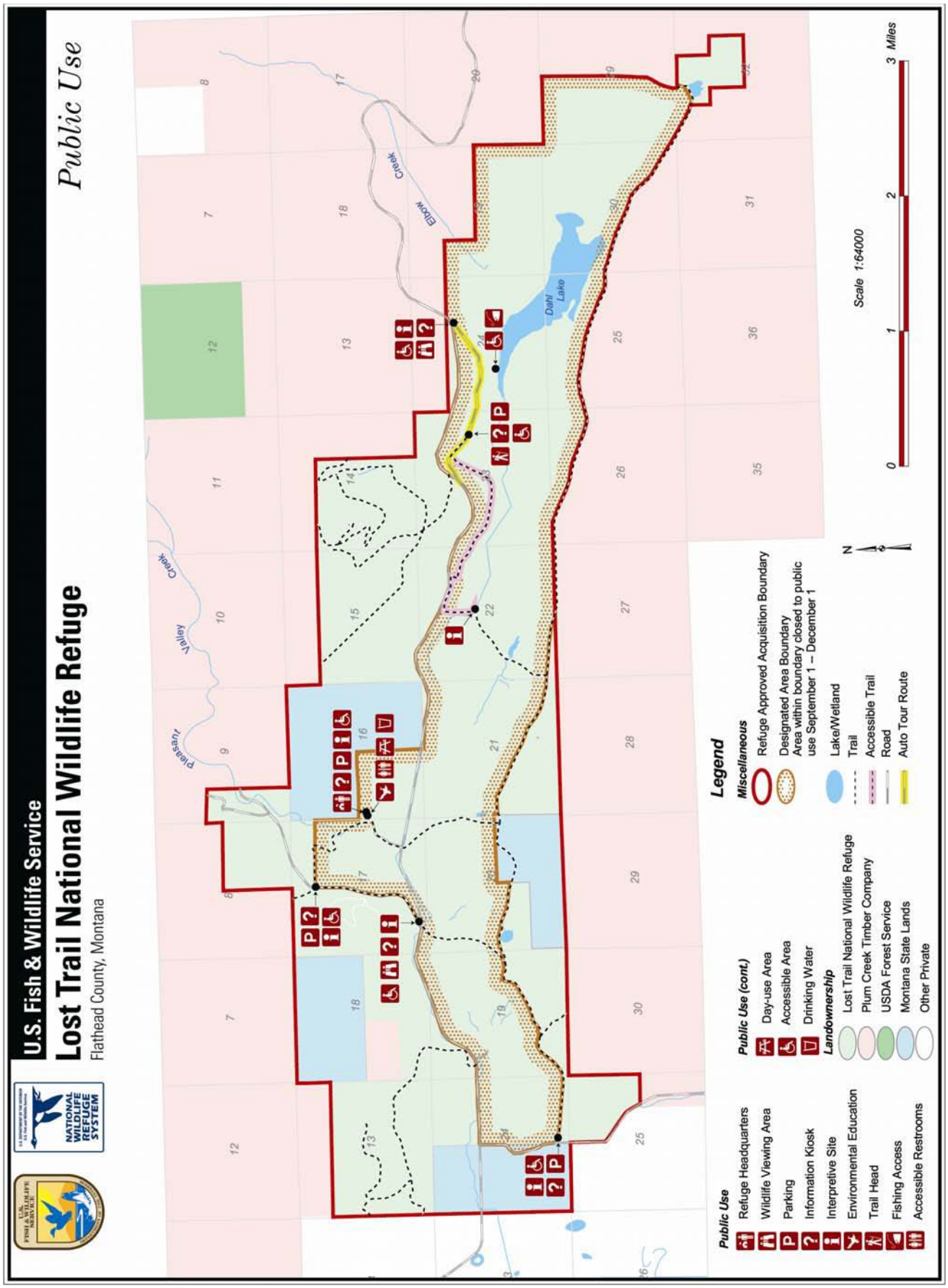


Figure 12. Public use at Lost Trail National Wildlife Refuge, Montana

Rationale

Careful planning provides the visiting public with opportunities to enjoy and appreciate fish, wildlife, plants, and other resources. As a result, the public will develop an understanding and will build an appreciation of each individual's role in the environment today and into the future.

Public Use Objective 3

Develop one accessible day use area within 3 years of CCP approval, to encourage participation in wildlife-dependent use opportunities, which will foster appreciation and support for fish, wildlife, and their habitat.

Strategies

1. Collaborate with Region 6's staff in EVS.
2. Design and develop facilities to meet accessibility standards in coordination with Region 6's EVS staff.
3. Request design assistance from the National Center on Accessibility, the Summit Independent Living Center, and other groups to ensure that sites are accessible for all users.
4. Develop one either-sex accessible restroom facility to be available during daylight hours.
5. Provide a source of drinkable water available during daylight hours.
6. Develop an accessible day use area with six tables and fire pits.
7. Provide one full-time and one half-time maintenance staff to construct and maintain public use facilities and areas.

Rationale

A day use area will support and encourage wildlife-dependent public uses by allowing visitors to stay longer and experience more of the refuge. The refuge is remote, with few nearby services and no nearby public eating or restroom facilities.

These basic facilities will allow visitors to stay longer and obtain a higher quality experience. This, in turn, will lead to more opportunities to appreciate and support fish, wildlife, plants, and their habitats; the refuge; and the Service. To provide for environmental education opportunities for school groups, the refuge will need to provide a place for students and educators to eat their lunch, along with drinkable water and restroom facilities.

Hunting Objective 1

Allow elk, deer, mountain grouse, and turkey hunting under MFWP regulations, starting fall 2002 in designated areas (appendix G); and provide a quality hunting experience to persons of all abilities within 5 years of hunt plan approval, resulting in at least 90 percent of hunters reporting a quality hunt, to provide quality opportunities for persons of all abilities to take part in hunting.

Strategies

1. Allow hunters access to portions of the refuge that will provide reasonable challenges and opportunities for taking targeted species under the described harvest objective and create minimal conflict with other priority wildlife-dependent recreational uses or refuge operations (appendix G).
2. Produce and distribute a tear sheet with a map that designates areas open and closed to hunting, along with all pertinent rules, regulations, and restrictions so hunters can make informed decisions (appendix G).
3. Make staff available at the contact station to provide rules, regulations, information, and first aid to hunters daily during the opening and closing weeks of archery and rifle seasons, and during weekends throughout hunting season. Staffing will be recruited from the National Bison Range Complex, as well as volunteers.
4. Inform hunters with disabilities (who have obtained a MFWP permit to hunt from a vehicle) about opportunities to access designated refuge management roads and trails, in collaboration with MFWP.
5. Provide information about opportunities on surrounding lands to allow hunters to plan for a quality experience, in collaboration with PCTC, Flathead National Forest, and MFWP.
6. Erect appropriate signs to designate closed and restricted areas to reduce the chance of noncompliance and conflicts with nonhunters.
7. Provide adequate law enforcement staffing during peak hunting periods, in collaboration with MFWP.

8. Develop and implement a monitoring system to receive input from hunters about their hunting experiences using direct interviews, registration stations at parking areas and trailheads, and mail-in/drop-off cards left on vehicles, working with Region 6's EVS staff and the Office of Management and Budget.
9. Evaluate hunting for its impacts on prey populations for the gray wolf; continue to authorize hunting unless it is determined to be in direct conflict with gray wolf survival.

Rationale

The Service recognizes hunting as a healthy, traditional outdoor pastime, deeply rooted in American heritage. When managed appropriately, hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

Local wildlife populations should be able to coexist with a hunt program. Elk populations within MFWP's hunting district 103 are consistently above MFWP objective levels. Refuge lands are primarily elk winter range. Removal of some elk within the refuge would facilitate adequate harvest levels and assist MFWP in optimum management of the local elk population.

White-tailed deer are year-round residents; mule deer primarily use the refuge in fall and winter. Their populations have been steadily increasing in the past 4 years. MFWP monitors both species to facilitate adaptive management using harvest regulations.

Hunting generally has no appreciable impact on healthy small game populations as the harvest is insignificant compared to natural mortality. Of the MFWP's seven regions, Region 1 yields 50 percent of the statewide harvest of mountain grouse, indicating a consistently high population in the area of the refuge and the ability to tolerate hunting pressure.

Turkeys were released in the area by MFWP to increase hunting opportunities. They are not indigenous to Montana and so are not a priority species for refuge management.

Hunting is a legitimate and appropriate public use of the Refuge System. Hunting programs will promote understanding and appreciation of natural and cultural resources and their management on all lands included in the Refuge System. Monitoring programs must focus on the impacts of recreational activities on wildlife, habitat, and the quality of experience for the public.

A quality hunt is defined as one that: (1) maximizes safety for hunters and other visitors; (2) is available to a broad spectrum of the hunting public; (3) provides hunters uncrowded conditions by minimizing conflicts and competition among hunters; and (4) provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program. It also minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife. By implementing successful monitoring techniques, hunting can be evaluated and adaptively managed to meet established standards and ensure that activities continue to be appropriate and compatible.

There is a history of extensive hunting on neighboring lands (PCTC has a block management plan in place with MFWP and there are a few sections of DNRC lands within the acquisition boundary of the refuge). Allowing hunting on portions of the refuge will allow for an expansion of hunting and provide for some quality opportunities.

The biggest restriction to a quality hunt is the limited staffing currently available. Much needs to be done to provide information needed by hunters—not the least being a clear and understandable handout with map, rules, and regulations, along with signing refuge boundaries and closed areas. Pulling staff from other areas of the complex to complete work for hunting may limit other wildlife-dependent public uses, although all can use some hunting resources (such as a public use handout).

Hunting Objective 2

Provide special youth-only hunts for deer and elk, during the first week of archery season and the first week of rifle season, starting fall 2002 to promote understanding, appreciation, and stewardship of the refuge and all system lands.

Strategies

1. Designate the first week of archery season and the first week of rifle season as youth-only hunts for hunters 12–14 years of age, accompanied by an adult at least 21 years of age.
2. Promote hunter education for youth by providing educational materials and outdoor education sites, in collaboration with MFWP.
3. Develop media contacts and outreach materials to inform the hunting community of hunting opportunities for youth.
4. Make law enforcement and other staff available during the youth hunts to provide a positive hunting experience and promote ethical hunting behavior; include volunteers and MFWP personnel, as well as one half-time, refuge, law enforcement officer.

Rationale

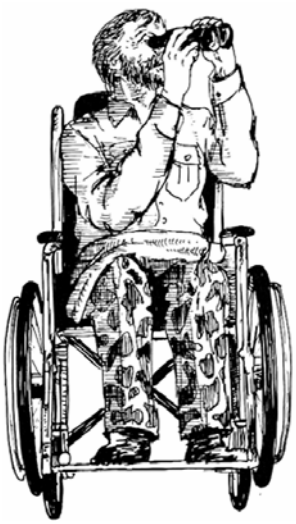
To continue this use and instill a conservation ethic into future citizens, the refuge can provide quality hunting experiences that will encourage and teach youth the pleasures and responsibilities of hunting.

The refuge is in a beautiful intermontane valley with quality opportunities for hunting. It is also remote, which provides for uncrowded hunting opportunities. This presents a good opportunity to introduce youth to hunting as well as foster a sense of appreciation and stewardship to the refuge and its mission of protecting fish, wildlife, and plants for future Americans.

This program needs to have adequate staffing to contact the majority of youth involved in these early hunts, to impart messages of conservation and ethical behavior. The refuge will need to partner extensively with MFWP and others to ensure the success of this program.

Hunting Objective 3

Provide easily accessible information to and personal contact with hunters for at least 95 percent compliance with refuge regulations, within 5 years of CCP approval, to encourage hunters to practice the highest standards of ethical behavior in attempts at taking wildlife.



Bob Savannah/USFWS

Strategies

1. Erect appropriate signs to designate closed and restricted areas to reduce the chance of noncompliance and conflicts with nonhunters.
2. Erect interpretive displays at designated parking areas (figure 12) and at the contact station that describe ways to hunt ethically and explain hunting rules, regulations, and restrictions.
3. Post and distribute refuge regulations prohibiting trapping to prevent accidental death of Canada lynx.
4. Make staff available at the contact station to provide rules, regulations, information, and first aid to hunters daily during the opening and closing weeks of archery and rifle seasons, and during weekends throughout hunting season. Staffing will be recruited from the National Bison Range Complex, as well as volunteers.
5. Provide one half-time law enforcement officer to be available in the field during hunting season to inform hunters of rules, regulations, and ethical behavior.
6. Annually monitor and evaluate the presence of boundary hunting adjacent to closed areas of the refuge. If necessary to discourage this practice, consider these actions: (1) alter hunt area boundaries or habitat; and (2) eliminate parking areas and access roads—to distribute hunters or modify wildlife use patterns in ways that make boundary hunting less appealing.

Rationale

The mission of the National Wildlife Refuge System is to conserve and protect wildlife, plants, and habitat. The Service desires a hunt that reflects positively on the refuge, the Refuge System, and the Service. However, hunting at the refuge is a relatively new use and there is limited history of impacts of hunters. The refuge will take the opportunity to "set the standard" early on so hunters will know what to expect in the future.

Fishing Objective 1

Determine, within 5 years of CCP approval, the feasibility of restoration of native sport fisheries, to address a previously unavailable use opportunity.

Strategy

1. Gather baseline resource data, review literature, and develop and implement restoration plans, in collaboration with NRCS, Trout Unlimited, MFWP, and USGS.

Rationale

The Service recognizes fishing as a traditional outdoor pastime that is deeply rooted in America's natural heritage. As long as the resources can support it, fishing should be considered a legitimate and appropriate public use. Fishing can foster understanding and instill appreciation of native fish, wildlife, and plants, while promoting support for their restoration and conservation and support of the refuge, the Refuge System, and the Service.

Fishing Objective 2

Carry out planning, funding, evaluation, and implementation of a restoration program for native fisheries—through at least four partnerships—within 5 years of determining a native sports fisheries is feasible, to develop quality, sport-fishing opportunities.

Strategies

1. Gather baseline resource data, review literature, and develop and implement restoration plans, in collaboration with NRCS, Trout Unlimited, MFWP, and USGS.
2. Provide one full-time biologist to coordinate refuge participation in sport-fishing partnerships.

Rationale

A goal of the National Wildlife Refuge System is to conserve and restore representative ecosystems. With the acquisition of Lost Trail into the Refuge System, there is an opportunity to restore the hydrology, fisheries, and riparian communities on the refuge.

Fishing Objective 3

Open at least 30 percent of fishable waters along Pleasant Valley Creek and Dahl Lake, with a minimum of one accessible fishing area that provides safe and uncrowded fishing opportunities, within 2 years of restoring a viable sport fishery if determined feasible, to provide a quality fishing experience.

Strategies

1. Design, develop, and maintain parking areas, trails, and accessible fishing platforms to provide access and protect resources. Pursue funding sources such as partnerships, grants, and fee programs.
2. Develop informational handouts (tear sheets) with a map, access points, rules, and regulations; handouts will be available at kiosks. Open and closed areas to fishing will be clearly signed.
3. Allow high-intensity activities outside the nesting season for bald eagles.
4. Limit human activity in key bald eagle areas.
5. Limit public access in trumpeter swan-nesting areas, depending on nest site location.
6. Develop a system to monitor the quality of fishing experiences using comment cards, personal contacts, and registration at fishing sites, working with the Service's Region 6 EVS staff.
7. Provide one full-time public use specialist to provide and monitor quality fishing opportunities.
8. Provide one half-time law enforcement officer to contact anglers and enforce rules and regulations.

Rationale

Fishing is one of the six wildlife-dependent recreational public uses defined in the Improvement Act. A quality program is a good way to help foster appreciation, support, and understanding of the refuge, the Refuge System, and the Service.

An effort should be made to accommodate fishing as long as it is compatible with resources and other wildlife-dependent public uses. At this time, there are no viable sport fishery opportunities at the refuge, due in large part to past land practices that changed the hydrology of Dahl Lake, Pleasant Valley Creek, and the watershed downstream.

Fishing Objective 4

Provide one fishing event for youth per year, involving at least 20 participants, within 2 years of hiring a public use employee, to increase youth appreciation of fish and fishing.

Strategies

1. To attract more participants and provide more educational opportunities, conduct the youth fishing program during National Fishing Week (early June).
2. Work with youth programs such as Girl Scouts, Boy Scouts, and schools to encourage a broad spectrum of fishing event participation.
3. Provide one full-time public use specialist and one half-time law enforcement officer to coordinate and conduct the fishing program for youth. Pursue funding sources such as partnerships, grants, and fee programs.
4. Collaborate with off-refuge youth fishing programs (such as MFWP, Hooked on Fishing, and Creston National Fish and Wildlife Center) and recruit community volunteers to help with events held at appropriate fishing sites off the refuge.

Rationale

Promoting youth fishing is an opportunity to introduce future generations to the pleasure and excitement of fishing. Those involved will not only learn how to fish successfully but ethically as well.

Wildlife Observation and Photography Objective 1

Provide opportunities for wildlife observation and photography by providing public access with minimal disturbance to wildlife and habitat, and developing designated viewing sites (one wildlife drive, two accessible wildlife-viewing areas, and one accessible trail), resulting in a 90 percent visitor satisfaction rate within 5 years of CCP approval, to promote public appreciation of natural and cultural resources.

Strategies

1. Open the area between the county road and the South Pleasant Valley Road (figure 12) to authorized public use only on designated trails from December 1 to September 1. Close the area to all public use from September 1 to December 1.
2. Open the uplands (figure 12) to authorized public use only on designated trails and roads from December 15 to April 1; open the uplands to public use on and off trails for the remainder of the year.
3. Allow existing levels of human activity if the bald eagle breeding area has at least 65 percent nest success, and has fledged at least five young during the preceding 5 years.
4. Limit disturbance to bald eagles and golden eagles by restricting construction of permanent developments such as kiosks, parking areas, and trails that may increase human activity within 0.5 mile of an occupied bald eagle nest or area with prime nesting potential.

5. Use signs to post areas closed to the public during use by trumpeter swans; develop interpretive material to explain closures for swans.
6. Coordinate with local schools, Girl Scouts, Boy Scouts, MCC, and other youth groups to build viewing sites while providing an educational experience for youth.
7. Evaluate proposed changes in public access prior to implementation; monitor for effects related to the grizzly bear if access is approved.
8. Develop and distribute public use surveys to determine quality of observation and photography experiences.
9. Gather information on member use of local wildland areas for wildlife observation and photography, in collaboration with local groups such as the Flathead Chapter of the Audubon Society and photography clubs.
10. Provide one full-time maintenance staff to build and maintain the wildlife-viewing area and trails.

Rationale

Wildlife photography and observation are two of the six priority wildlife-dependent recreational public uses as defined in the Improvement Act. They should be provided for if found compatible and if the refuge has the resources to support them.

Promoting wildlife photography and observation of plants, animals, and their associated habitats can foster an understanding of and increase public appreciation for America's natural resources and the role of the Refuge System in managing and protecting these resources. The refuge is part of an intermontane ecosystem that typically has been used for farming and ranching. The refuge offers a unique opportunity for the public to view plants and animals in a natural ecosystem setting.

Wildlife Observation and Photography Objective 2

Make contact with 90 percent of visitors via the visitor contact station, interpretive materials, and interpretive kiosks, starting within 2 years of CCP approval, to provide quality wildlife observation and photography opportunities, and promote public appreciation of natural and cultural resources.

Strategies

1. Erect and maintain at least three accessible kiosks with maps, rules, and regulations. Post the best, current observational and photographic opportunities for wildlife (figure 12). Provide maintenance personnel to build and maintain kiosks.
2. Design and develop facilities to meet accessibility standards in coordination with Region 6's EVS staff.
3. Open the headquarters/contact station to the public a minimum of 5 days a week, including weekends during peak use (e.g., hunting season).
4. Develop materials about wildlife-dependent recreational use allowed on the refuge, including rules and regulations; post at the contact station and at all kiosks, pullouts, and trailheads; include information to encourage ethical behavior among users.
5. Monitor the wildlife observation and photography program with observation of visitor use, comment cards, car counters, personal contacts, review of law enforcement incidents, and tracking of wildlife movements and resource damage.
6. Develop and distribute public use surveys to determine quality of observation and photography experiences.
7. Provide one full-time public use specialist to work with the Service's Region 6 EVS staff to design, develop, and monitor the program for wildlife observation and photography.
8. Provide one full-time public use specialist to recruit volunteers to staff the contact station to allow for minimum and increased operation.
9. Provide one half-time clerk to staff the contact station and dispense information.

Rationale

Information will be provided to visitors to enable them to pursue high-quality wildlife-dependent recreational activities while connecting to resources. This will provide opportunities for them to develop an understanding and appreciation for natural and cultural resources. In addition, visitors will have information on how to use the refuge in an appropriate and compatible manner.

Wildlife Observation and Photography Objective 3

Encourage the highest standards of ethical behavior by the public during wildlife observation and photography, with 90 percent of visitors understanding and following procedures within 5 years of CCP approval, to provide quality wildlife observation and photography opportunities and limit resource damage.

Strategies

1. Develop materials about wildlife-dependent recreational use allowed on the refuge, including rules and regulations; post at the contact station and at all kiosks, pullouts, and trailheads; include information to encourage ethical behavior among users.
2. Instill ethical observation and photography behavior through presentations, workshops, and field trips, in collaboration with local outdoor groups such as the Flathead Chapter of the Audubon Society, Boy Scouts, and Girl Scouts.
3. Educate the public on how to minimize winter disturbance and stress to large mammals during recreational activities.
4. Monitor the wildlife observation and photography program with observation of visitor use, comment cards, car counters, personal contacts, review of law enforcement incidents, and tracking of wildlife movements and resource damage.
5. Provide one half-time law enforcement officer to contact the public, educate about and enforce ethical standards, and enforce rules and regulations.

Rationale

Wildlife photography, wildlife observation, and interpretation are a great means of fostering understanding and instilling an appreciation of native fish, wildlife, and plants and their conservation. Providing the public with a safe, quality wildlife observation and photography experience includes following ethical behavior that results in minimal disturbance to wildlife and plants.

A balance that allows for quality public use opportunities without negatively affecting the resources is sought. This will ultimately ensure that wildlife viewing and photography is available for future generations. The definition of "authorized access" (foot travel, snowshoes, skis, mountain bikes, and horses) will be determined in the appropriate step-down plan.

Interpretation Objective 1

Develop interpretive materials and disseminate them to at least 90 percent of visitors, within 2 years of program funding and staffing to promote public appreciation of natural and cultural resources.

Strategies

1. Erect standard refuge entrance signs at entries along main roads.
2. Develop a public use brochure with a clear map, wildlife-dependent recreational opportunities, rules, and regulations; make brochure available at accessible points within 2 years (figure 12).
3. Develop an interpretive handout with tips for ethical viewing behavior and the advantages of following them, i.e., less disturbance to wildlife provides more viewing opportunities.
4. Develop an interpretive display to post at the contact station, kiosks, parking areas, and trailheads to inform users of ethical behavior.
5. Design and develop interpretive displays for the contact station, working with the Service's Region 6 EVS staff, the National Center for Accessibility, and the Summit Independent Living Center.
6. Erect and distribute interpretive signs and materials at parking areas, wildlife-viewing areas, trailheads, and the contact station.
7. Limit disturbance to bald eagles and golden eagles by restricting construction of permanent developments such as kiosks, parking areas, and trails that may increase human activity within 0.5 mile of an occupied bald eagle nest or area with prime nesting potential.
8. Develop an outreach program for the public on the grizzly bear and recovery efforts, to develop better support for and understanding of the species and to minimize adverse human actions and conflicts. Work with the interpretation and education subcommittee of the Interagency Grizzly Bear Committee.
9. Use letters, phone calls, informational meetings, and door-to-door visits to educate and inform the public on the progress of wolf recovery and the development of livestock protection methods.
10. Monitor interpretive services and messages through feedback from visitors—observation of visitor's use and personal contacts, comment cards, car counters, law enforcement incidents, and registration at kiosks, observation sites, parking areas, contact stations, and trailheads.
11. Provide one full-time public use specialist to work with Region 6 EVS staff to develop a station brochure and handouts.
12. Provide one half-time clerk to staff the contact station and dispense information.
13. Provide one full-time biologist work to work with MFWP and NRCS to gather data on wildlife and plants for development of species lists.

Rationale

Interpretation is a great way to relate the natural resources to visitors. It allows them to come to appreciate and support the management of the refuge. Interpretive materials will include information on best areas and times to receive quality experiences. Information will help reduce conflicts between users and reduce resource damage. It will provide the public with access to rules and regulations.

Interpretation Objective 2

Develop interpretive themes within 10 years of hiring a public use specialist. Major themes will include wetlands, endangered species, history of Pleasant Valley, management of Lost Trail National Wildlife Refuge, the National Wildlife Refuge System, and the Service, to increase visitors' understanding and support, as well as their appreciation of fish, wildlife, plants, and their habitats.

Strategies

1. Interpret the mission of the refuge, the National Wildlife Refuge System, and the Service through direct contact of staff with visitors.
2. Develop interpretive materials about management of the refuge, the national wildlife Refuge System, and the Service.
3. Develop interpretive materials about the history of Pleasant Valley, in collaboration with the CSKT, local history groups, and neighbors.
4. Educate the public on how to minimize winter disturbance and stress to large mammals during recreational activities.
5. Develop interpretive materials about endangered species, working with Region 6's ecological services staff.
6. Develop an interpretive panel about wolves to be displayed in the visitor contact station or at a kiosk.
7. Develop interpretive material about Spalding's catchfly to educate the public on identification of the plant, habitat requirements, and why the plant is endangered.
8. Provide one public use specialist to work with Region 6's EVS staff to develop a handout with observational and photographic and observational opportunities along with successful techniques a comprehensive map, rules, and regulations.

Rationale

Interpretation is one of the six wildlife-dependent recreational public uses as defined in the Improvement Act. Well-designed interpretive services can be a most effective and inexpensive resource management tool. For many visitors, taking part in one or more interpretive activities is their primary contact with refuge staff and could be their first contact with the refuge, conservation, and wildlife.

There is an opportunity to foster a sense of understanding and appreciation of the refuge and the Service, as well as influence visitors' behaviors when visiting units of the Refuge System. Personal contact can help us make management decisions and build public support by providing insight into management practices.

Interpretive planning and subsequent activities and products can:

- help visitors understand the impacts of their actions, minimizing unintentional resource damage and wildlife disturbance;
- communicate rules and regulations so they relate to visitors, solving or preventing potential management problems;
- help the refuge make management decisions and build public support by providing insight into management practices.

Interpretation Objective 3

Ensure that at least 75 percent of visitors understand wetland values and the refuge's contribution to restoration and protection of Pleasant Valley wetlands, within 5 years of CCP approval, to promote public appreciation of natural resources.

Strategies

1. Develop interpretive materials about wetland restoration within 2 years, in partnership with NRCS.
2. Coordinate with local schools, Girl Scouts, Boy Scouts, MCC, and other youth groups to build interpretive nature trails while providing an educational experience for youth.
3. Provide one full-time public use specialist to work with Region 6's EVS staff and NRCS to design and develop interpretive displays about wetlands to be erected at the Dahl Lake wildlife-viewing area, along interpretive trails, and at the contact station (figure 12).

Rationale

Wildlife conservation is the first priority of the System, and new and ongoing recreational use programs should help visitors focus on wildlife and other natural resources. Activities should make visitors aware of the most important resource issues at the refuge, be supportive of management plans that address those issues, and show how the refuge contributes to the mission of the Refuge System.

The refuge was established as partial mitigation for habitat and wildlife losses and impacts on Flathead WPA due to erosional losses caused by increased Flathead Lake water levels (due to the operation of Kerr Dam by the MPC). Prior to Service acquisition, the MPC, in partnership with the NRCS, worked to protect portions of the refuge by purchasing a wetland easement under the WRP. Continuing partnerships will deal with restoring the hydrology, wetland, and stream ecology of Dahl Lake and Pleasant Valley Creek.

The story of wetland mitigation and protection is an essential element to the establishment of this refuge. The visiting public should be exposed to this story and the partners involved.

Environmental Education Objective 1

Develop an extensive environmental education program, including development of a formal partnership, within 5 years of CCP approval, to allow students and educators to gain hands-on experiences and appreciation of natural resources.

Strategies

1. Develop an environmental education manual that fulfills both the educational requirements of local and nearby students and the vision and goals of the refuge. Work closely with Pleasant Valley and Marion school districts.
2. Pursue grants that will allow schools to participate in environmental education at the refuge, in coordination with the school boards of Pleasant Valley and Marion schools.
3. Develop and present teacher workshops; obtain provider status from the Montana State Office of Public Instruction.
4. Become a member of the Environmental Education Core Group, a coalition of local individuals and groups (private and governmental) involved in environmental education.
5. Create a nonprofit group to support environmental education and research at the refuge, in coordination with the Montana State University extension office (Flathead County).
6. Develop a program to be presented to local schools on wolves, their biology, and their importance in the ecosystem.
7. Monitor the overall effectiveness of the environmental education program by tracking the number of teachers, students, and groups using the resources, and by providing feedback forms to educators.
8. Provide one full-time public use specialist to develop, implement, and monitor the environmental education program.
9. Provide one career-seasonal law enforcement officer to support the environmental education program.
10. Recruit and train volunteers to assist in developing and presenting environmental education programs.
11. Provide training to environmental education staff at least once a year to attain the knowledge, skills, and abilities to support environmental education at a minimum level.

Rationale

Environmental education is one of the six appropriate wildlife-dependent recreational public uses as defined in the Improvement Act. Quality environmental education programs will promote understanding and appreciation of natural and cultural resources, and so foster support and stewardship of the refuge, Refuge System, and Service.

Partnerships will extend refuge funding and staffing to reach a wider audience.

Environmental Education Objective 2

Develop and maintain a lending library of extensive materials and resources within 2 years of CCP approval, to provide up-to-date and Service-related environmental education materials for educators.

Strategies

1. Research and obtain materials relevant to natural and cultural resources of the refuge and Pleasant Valley.
2. Develop and gather environmental education materials, working with Region 6's EVS staff and the Service's National Conservation Training Center (NCTC), division of educational outreach.
3. Establish formal partnerships with school districts and community groups to assist with development, implementation, and promotion of the library.
4. Provide in-school materials to orient students prior to field trips to convey safety messages and describe appropriate field conduct to minimize resource damage.
5. Provide information sheets and wolf education boxes to schools.
6. Monitor the overall effectiveness of the environmental education program by tracking the number of teachers, students, and groups using the resources, and by providing feedback forms to educators.
7. Provide one full-time public use specialist to develop, organize, maintain, and distribute library materials.

Rationale

Creating and providing a lending library of materials and resources for teachers and other educators is a Service recommendation for providing a minimal environmental education program. The library will be a good way to provide educational materials geared toward the refuge and its natural resources and history. Library materials will provide background about the Service, which will help promote support and stewardship. The library will provide educators with materials to develop programs, and reinforce lessons learned during field trips. Library materials will include field guides and activities to use on site.

The Service recommends that field station environmental education programs, at a minimum, should include:

> creating or providing a lending library of materials and resources for teachers and other educators;
>
> designating a trained staff contact person for environmental education;
>
> designating a study site and providing stewardship opportunities;
>
> helping local educators identify refuge resources and develop programs;
>
> forming partnerships or recruiting and training volunteers including senior citizens and people with disabilities to conduct environmental education activities.

Environmental Education Objective 3

Provide on-site field trips to educators and students upon request to foster stewardship of the land, understand the refuge mission of conserving natural resources, and experience the wonder of native fish, wildlife, and plants as well as the culture and history of the area.

Strategies

1. Develop refuge-based themes such as wetlands, endangered species, and local history. Incorporate local, state, and national educational standards into programs, working with local schools.
2. Select and develop a designated environmental education site (figure 12), working with Region 6's EVS staff and the National Center on Accessibility.
3. Provide in-school materials to orient students prior to field trips to convey safety messages and describe appropriate field conduct to minimize resource damage.
4. Conduct at least one field trip or environmental education activity per year in collaboration with the Pleasant Valley and Marion schools to aid in students' biology education.
5. Conduct at least one hands-on project per year for biology student in collaboration with the Montana Academy to aid in students' biology education, as well as benefit refuge resources.
6. Develop on-site monitoring and research programs for students and educators with an emphasis on wildlife conservation and the importance of wetlands, working with the refuge's biology staff and the NRCS.
7. Develop partnerships with local schools, Girl Scout, Boy Scouts, the MCC, and other youth groups to provide an educational experience through participation in fence removal, facility maintenance, and other habitat management projects.
8. Monitor the overall effectiveness of the environmental education program by tracking the number of teachers, students, and groups using the resources, and by providing feedback forms to educators.
9. Provide one full-time public use specialist to develop, implement, and monitor the environmental education program.

Rationale

Opportunities for hands-on experience with the resource will foster appreciation and support of the refuge and the Service. Involving students in simple monitoring projects will instill a sense of ownership and stewardship to the resources. This is a good way to advance science literacy through an interdisciplinary educational approach.

Learning and stewardship activities with direct contact with the resource will provide opportunities to contribute to refuge management goals. These activities will allow students and educator to see the changes to the environment their assistance has produced. Long-term projects will reinforce conservation messages learned in the field. The projects will be a means to give educators experience to bring back to the classroom and add depth to their messages. In addition, the activities will teach students and educators about resources while getting needed help for restoration projects.

Due to its diversity of habitat and wildlife species, the refuge lends itself to quality, outdoor environmental education. Educational institutions presently schedule environmental education field trips to other land management units of the National Bison Range Complex.

Interaction with the Montana Academy and other local schools will aid the refuge in providing environmental education opportunities, develop

community support, and promote interest in future goals and projects. Children located in the Pleasant Valley will be able to further their appreciation for the surrounding environment. In addition, this will help establish community support that will increase interest and understanding of the refuge and the Refuge System.

ADMINISTRATION

Organizational structure, staffing, facilities, equipment, and maintenance are administrative items addressed in the management direction.

GOAL

Provide staffing, funding, and facilities to maintain the long-term integrity of habitats and wildlife resources of Lost Trail National Wildlife Refuge in supporting the achievement of ecosystem and National Wildlife Refuge System goals.

Operations Objective 1

Form a new complex comprised of Lost Trail National Wildlife Refuge, Swan River National Wildlife Refuge, and Flathead County units of the Northwest Montana WMD, separate from the National Bison Range Complex, within 15 years of CCP approval, to better address interests unique to this area of northwestern Montana and anticipated increased public use.

Strategies

1. Provide a separate organizational code and appropriations (by the Service's Region 6 headquarters) for future operations, maintenance, and administration of the refuge.
2. Transfer the annual funding from the National Bison Range to the reorganized refuge complex for two full-time employees (one on-site supervisory refuge operations specialist and one wildlife biologist) and one career-seasonal employee (maintenance).

Rationale

The following factors justify consideration of Lost Trail National Wildlife Refuge with other Service land management units in Flathead County as a field station separate from the National Bison Range Complex:

- size of the refuge
- level of daily operations
- planned staffing with subsequent supervisory responsibilities
- political "awareness and inherent sensitivity of refuge activities within the local area and the Columbia Basin Ecosystem"
- wildlife activities, interests and activities unique and particular to this area of northwestern Montana
- anticipated increased public use activities

Operations Objective 2

Provide adequate resources and staff to administer, develop, and maintain refuge habitat, facilities, programs, and public use for the period of this CCP, within 2 years of CCP approval, to perform the restoration, management, activities, and monitoring described in the CCP to achieve the refuge's goals. Provide on-site law enforcement (overt, covert, and preventative) within 5 years of CCP approval, to provide quality public use experiences, while ensuring the protection of refuge resources.

Strategies

1. Recruit one supervisory refuge operations specialist (GS-12) to provide management operations, oversight, and administration for the refuge and other Service units north of the refuge.
2. Maintain the on-site, full-time refuge manager (GS-11, supervisory refuge operations specialist) to provide daily supervision and oversight to all activities and operations.
3. Recruit one full-time maintenance worker and one part-time maintenance worker (both WG-8) to provide adequate resources to operate, maintain, and repair facilities.
4. Hire one public use specialist (GS-11) to coordinate the public use program and facilities.
5. Hire one part-time administrative support assistant (GS-4/5) to provide daily on-site clerical and administrative support.
6. Develop a web page to describe available maintenance resources and to monitor and track materials.
7. Coordinate and plan equipment needs with the maintenance supervisor and project leader at complex headquarters through the refuge operating needs system (RONS) and maintenance management system (MMS) processes, to acquire appropriate equipment to maintain facilities and habitats (e.g., tractor, mower, backhoe, pickup, dump truck, motor boat, vehicle hoist, equipment repair tools and diagnostics, and carpentry tools and machinery).
8. Maintain equipment in a safe and efficient operating status.
9. Replace and add equipment through the RONS planning process as needed (due to normal deterioration and needed repair, and as staffing is increased).

10. Acquire necessary office equipment including computers and Internet access.
11. Provide microscopes and lab and other necessary equipment to support the environmental education curriculum.
12. Provide field guides, binoculars, and spotting scopes to assist with census work.
13. Provide VCRs, televisions, and PowerPoint equipment to preview audiovisual materials.
14. Provide satellite capacity for the Service's "distance from learning" program.
15. Communicate with MFWP staff to maintain adequate levels of law enforcement on and adjacent to the refuge (on public lands).
16. Provide one half-time law enforcement officer to protect natural and cultural resources by coordinating with MFWP.

Bernardo Garza/USFWS

Refuge Maintenance Shop

Rationale

The refuge manager currently directs, implements and supervises daily administrative, management, public use, and maintenance activities and operations of the refuge. In addition, the refuge manager coordinates these types of activities on five WPAs in Flathead County and on Swan River National Wildlife Refuge.

The following factors dictate the necessity of an on-site refuge manager for the life of this plan:

- the size of the refuge
- on-going administrative and operational activities
- required maintenance needs
- community interest
- potential environmental education and interpretative programs
- recreational opportunities
- proximity to rural communities as well as a major, growing metropolitan area (Kalispell)

Increased management and administrative responsibilities associated with development of a new refuge necessitates the need for a GS-12 supervisory position to assist with directing all Refuge System programs and to meet the goals and mission of the Service.

With the refuge being newly established, there is a multitude of resource data to be collected that would assist and enable refuge managers to properly manage the refuge in accordance with applicable laws and Service policy. A full-time wildlife biologist will implement the biological program including monitoring, evaluation, and analysis of all habitats and associated ecosystems (streams, wetlands, grasslands, and forested areas).

Managing habitats to fulfill refuge purposes and prevent invasive plant destruction of ecosystem functions is necessary to meet the mission of the Refuge System. Development and administration of the public use program and facilities to provide the visiting public with a quality, safe, wildlife-dependent recreational experience is also necessary to meet the mission.

Increased staffing, administration, public use programs, equipment, biological data collection, and monitoring will result in the need for additional administrative support to effectively communicate, budget, and perform time and attendance and hiring activities.

Managing resources and infrastructure to meet Service guidelines and policies will require adequate maintenance staff with proper tools and equipment. Implement the refuge operating needs system project for acquiring appropriate equipment and supplies to maintain refuge habitats and public use facilities (i.e., purchase of herbicide sprayers, mower, and tractor; and recurring costs of herbicide, mechanical invasive plant control, biological invasive plant control, and public use facilities maintenance).

The safe and efficient operation of the refuge is dependent on having the necessary equipment to carry on daily operations. It is necessary, practical, reasonable, prudent, and proper to maintain necessary vehicle, shop, and office equipment as funding allows.

Increased authorization of public recreational activities will result in a need for a full-time law enforcement presence to ensure a safe and enjoyable experience by refuge visitors while ensuring the protection of natural and cultural resources.

Operations Objective 3

Annually use volunteers to assist with maintenance, biological monitoring, and public use activities to implement effectively and efficiently the CCP.

Strategy

1. Provide one three-quarters-time volunteer coordinator to implement the "friends program."

Rationale

Volunteers assist in organizing and conducting programs such as limited environmental education programs with local schools, refuge interpretation, minor facility and equipment maintenance, and various wildlife surveys.

Facilities Objective 1

Continue to provide adequate administrative and maintenance facilities within 3 years of CCP approval, and ensure needed facilities and structures are maintained to Service standards during the period of this CCP, to provide support for refuge staff and programs, and for public safety.

Strategies

1. Repair and maintain facilities, buildings, fences, and roads on an "as-needed basis."
2. Complete facility maintenance and fence removal through assistance from the MCC and the RMEF.
3. Complete modifications of the horse arena to provide administrative space, a maintenance shop, and equipment storage; submit as a RONS project to modify the building and acquire equipment and tools including a phone system, computers, work stations, filing and storage cabinets, a vehicle lift, a vehicle wash bay, equipment repair tools, carpentry tools, and metal working tools.
4. Coordinate with Flathead Wildlife, Inc. to assist with building parking areas for designated public use activities and assist with habitat management projects.
5. Develop and implement a RONS and MMS projects list to provide necessary public use-dependent equipment and facilities.
6. Work with the Service's Region 6 staff (education and visitor services) on design and accessibility requirements.

Rationale

Increased staff makes it necessary to maintain these facilities to avoid major and costly maintenance.

To adequately manage programs, it is necessary to provide productive workspace supplied with the necessary equipment, tools, and supplies to accomplish refuge and Service objectives.

An increase in public use activities will necessitate design and development of additional public use facilities.

Facilities Objective 2

Identify and remove unnecessary structures and facilities within 10 years of CCP approval, to provide for restoration of habitat, protection of wildlife, reduction of maintenance needs, and public safety.

Strategies

1. Remove unnecessary structures and facilities as deemed necessary.
2. Complete facility maintenance and fence removal through assistance from the MCC and the RMEF.
3. Continue the annual fence removal project (RMEF challenge cost-share grant initiated in 2000).
4. Use students to assist with fence removal or various other habitat management projects.
5. Recruit volunteers for projects such as cleanup or removal of other facilities.

Rationale

Many structures and facilities were previously used in ranching activities. Many of these facilities:

> are in excess to Service needs and are occupying areas that are potential grassland habitats;
>
> are detrimental as a wildlife hazard or a harbor for predators of ground-nesting birds;
>
> increase maintenance costs;
>
> increase fixed costs;
>
> detract from the natural appearance of the landscape.

By removing these structures and facilities, maintenance costs will decrease, unnecessary facilities will be eliminated, and habitat will be restored.

PARTNERSHIPS

Partnerships that support overall management of the refuge are addressed in this management direction. Partnerships for single-type or localized activities have been described in the above topics.

GOAL

Promote and develop partnerships with adjacent landowners, public and private organizations, and other interested individuals to preserve, restore, and enhance a diverse and productive ecosystem of which Lost Trail National Wildlife Refuge is an integral part.

Partnerships Objective 1

Meet once a year with the NRCS and private landowners in the Pleasant Valley to coordinate and collaborate on an interagency, land steward partnership to protect more than 5,800 acres of wetland and wetland-related habitat, within 3 years of CCP approval.

Strategy

1. Coordinate closely with the NRCS on stream and wetland restoration throughout the WRP.

Rationale

Partnerships will assist in preserving resources of the Pleasant Valley ecosystem for future generations. Approximately 1,700 acres of the refuge were purchased subject to an existing WRP easement; therefore, the refuge will abide by NRCS rules and regulations to restore the hydrology of the WRP easement area. The WRP project as a whole is important to the hydrology of the entire valley not just the WRP easement that lies within the refuge boundary. In working with these partners, restoration of hydrology and vegetation on and adjacent to the refuge will be an important step in restoring the ecosystem to historical conditions.

Partnerships Objective 2

Partner with nongovernmental organizations (RMEF, Audubon Society, Landmark Volunteers, MCC, and Flathead Wildlife, Inc.) to conduct habitat and maintenance activities and collect biological data for the first 5 years after CCP approval, to increase conservation efforts.

Strategies

1. Collaborate with Partners for Fish and Wildlife to continue restoration on the refuge and adjacent lands.
2. Continue the annual RMEF fence removal project (challenge cost-share grant initiated in 2000) until all unnecessary fencing materials are removed.
3. Continue to seek the assistance of MCC members as well as Landmark Volunteers for facility maintenance and fence removal.
4. Continue writing project advisory committee grant proposals for assistance with the invasive plant program until the refuge can support its own needs for invasive plant control. This includes money, applications, and monitoring.
5. Continue protection of species of concern with conservation easement partners such as the NRCS, WRP, MFWP, Montana Land Reliance, The Nature Conservancy, and Audubon Society.
6. Continue to encourage Audubon volunteers to assist the refuge with migratory bird surveys, owl surveys, rail surveys, looking for rare species, monitoring bald eagle nests, and monitoring black tern nesting colonies.
7. Continue to seek the assistance of Flathead Wildlife, Inc. to assist with building parking areas for designated public use activities and to assist with various habitat management projects.
8. Sign up various volunteer work crews for other projects that need attention, i.e., removal of the east cattle station or cleanup and removal of other facilities.

Rationale

Grants allow for additional funding, which the complex lacks, for management issues. The RMEF has enthusiastic and willing volunteers that will assist with big game winter range improvement. Use of volunteers provides extensive help with little or no cost. This volunteer effort has been critical for removing 75 miles of interior barbwire fence, which currently hinders big game movement throughout the refuge.

Labor forces within the refuge are minimal. Crews from groups such as the RMEF will be essential to completing projects such as fence removal, facility maintenance, and other labor-intensive projects that will enhance wildlife habitat.

The refuge often times does not have enough staff to complete all monitoring and inventory needs. The National Audubon Society has people who are enthusiastic and generally knowledgeable about birds. With a little training from staff, this partnership will help establish baseline data needed for management decisions.

Additional funding will assist with other habitat management projects involving volunteers. The mission of the MCC is to bring together Montana's commitment to its people and its natural resources by enhancing citizenship and employability through stewardship of our lands and community service.

The model of the MCC is:

young people + hard work + meaningful projects
= quality citizens and a better environment

The refuge will help fulfill this mission with community service projects that will provide for habitat management benefits. Removal of fencing, and facility maintenance, are high priorities. The benefits are numerous since fence removal helps wildlife movement throughout the refuge, as well as reducing the number of unwanted fence lines within the boundaries of the refuge.

Allowing interest groups to assist with these types of projects will make them less expensive and more feasible to accomplish within a reasonable amount of time. In turn, this allows community members to be involved at the refuge with hands-on assistance.

Partnerships Objective 3

Develop a "friends group" for a mutually agreed-upon area of the refuge within 3 years of CCP approval, to enhance management, programs, or funding of refuge programs.

Strategies

1. Work with the Flathead County extension office to develop a "friends group" and a direction of focus.
2. Provide the necessary office equipment and space to such partners as a "friends group."
3. Meet with "friends group" volunteers at least twice a year to determine group direction and assist where appropriate.

Rationale

Development of a "friends group" will increase public awareness, involvement, and support. It will promote cooperation among varied conservation and environmental groups.

Partnerships Objective 4

In conjunction with PCTC; MFWP; Montana DNRC; USDA Forest Service; and private landowners, determine the opportunities and feasibility for a forest legacy easement within 5 years of CCP approval.

Strategies

1. Review forest lands on and near the refuge for threats from development.
2. Determine opportunities for establishing a forest legacy easement, through discussions with partners.
3. Acquire a forest legacy easement to protect forests adjacent to the refuge and within the Pleasant Valley from development, in collaboration with all partners.

Rationale

The refuge was created to preserve habitat and the wildlife that uses it. Development in the area could potentially increase invasive plants, provide for more domestic animal conflicts, and increase disturbance to resident wildlife. This program will encourage the current land use of private lands and ensure the public value of the forests is protected. The group will protect critical wildlife habitat and conserve watershed functions, however it will maintain all recreation opportunities.

Partnerships Objective 5

Share law enforcement responsibilities with MFWP during deer, elk, and upland game bird hunting seasons, on and adjacent to the refuge (on public lands), for the duration of this CCP, to efficiently provide quality public use experiences, while ensuring the protection of refuge resources. Coordinate with the local sheriff's office and the Montana Highway Patrol to address and deal with potential issues outside of the hunting season and to provide law enforcement personnel with backup and law enforcement assistance when needed.

Strategies

1. Maintain adequate levels of law enforcement assistance during hunting seasons for big game and upland game birds through continued communication with MFWP.
2. Provide one half-time law enforcement officer to protect natural resources by coordinating with MFWP.

Rationale

A working relationship with MFWP must be developed and maintained to ensure an ethical, lawful, and quality hunting experience—or there can be no hunting program on the refuge. Law enforcement personnel will be available for other enforcement needs.

Partnerships Objective 6

Meet once a year with PCTC, RMEF, Flathead and Lincoln counties weed departments, and the USDA Forest Service to maintain partnerships for collaboration and mutual assistance with invasive plant control, access, and road maintenance issues, for the period of this CCP.

Strategies

1. Coordinate with the PCTC where shared-easement road maintenance is applicable.
2. Continue to discuss, with partners, alternatives for invasive plant control within the Pleasant Valley.
3. Develop a strategy with partners for control of tansy ragwort and how to prevent it from becoming a dominant plant species within the Pleasant Valley.
4. Attain assistance with tansy ragwort control from the Tansy Trust Fund grant program, as well as from the Service's challenge cost-share grants.
5. Coordinate fire suppression issues and protocols at annual meetings with Montana DNRC.

Rationale

Assistance in all areas of invasive plant control must be coordinated to have the maximum possible impact within the Pleasant Valley. Working with the grant program provides needed funding. The refuge will seek to preserve the valley and the ecosystem for future generations to enjoy and use for recreation. To maintain the current working relationship within the Pleasant Valley is also a critical tool for proper management of the refuge. Use of road 1019 is permitted, however maintenance issues must be addressed annually.

The Service currently does not have staff and funding to maintain roads that are damaged or destroyed by partners—the issue of maintenance is addressed in the easement document that allows use of these roads. The easement document mandates that maintenance of specified roads be based on primary usage of these roads by refuge staff or partners that caused the damage.

In addition, keeping an open working relationship with partners will allow for future negotiations and consultations for the ensured preservation of the Pleasant Valley.

Partnerships Objective 7

For the period of this CCP, collaborate with the Flathead County Road Department regarding refuge signage and potential cooperative road maintenance and possible relocation issues concerning Pleasant Valley Road.

Strategy

1. Control beaver activities that impact Pleasant Valley Road, i.e., flooding, through coordination with MFWP.

Rationale

County road crews maintain Pleasant Valley Road, which traverses the refuge. Road issues and maintenance concerns should be discussed and dealt with on a regular basis. Due to the layout of the road, any problems with the road may be dangerous to refuge staff as well as the visiting public.

Partnerships Objective 8

Continue issuing annual special-use permits with the USDA Forest Service for use, maintenance, and invasive plant control on refuge road North 1019, as needed for the period of this CCP.

Strategy

1. Issue a special-use permit to the USDA Forest Service for use of road 1019 for logging activities on land north of the refuge.

Rationale

Same rationale as for objective 7.

Partnerships Objective 9

Continue coordination with Bonneville Power Administration regarding the power line easement for the duration of this CCP.

Strategy

1. Continue to abide by rules and agreements in the existing power-line easement document. Annually review the easement document and coordinate all refuge activities that may affect the power line with Bonneville Power Administration.

Rationale

The refuge was acquired subject to the existing power line easement and, therefore, is legally required to abide by the existing terms of the easement.

Partnerships Objective 10

Maintain the statewide memorandum of understanding with the DNRC for wildland-fire suppression efforts for 15 after CCP approval.

Strategies

1. Operate under the statewide agreement with the Montana DNRC for fire suppression on the refuge.
2. Coordinate fire suppression issues and protocols at annual meetings with Montana DNRC.

Rationale

DNRC and the Service have entered into a memorandum of understanding for wildland fire suppression on the refuge. Interagency wildland-fire suppression efforts are necessary due to lack of staff. DNRC is the logical choice since they maintain a fire station within 15 miles, allowing for 24-hour assistance and quick response during the fire season.

Partnerships Objective 11

For the period of this CCP, continue coordination with PCTC and their lessee regarding grazing issues on adjacent PCTC lands.

Strategies

1. Continue coordination with PCTC regarding maintenance of existing fence lines.
2. Meet with the PCTC representative and lessee annually, prior to grazing.

Rationale

The PCTC is the principle landowner surrounding the refuge. Grazing on these lands is an annual occurrence from June 15 to October 15. Not all of the refuge is properly fenced, therefore continued coordination and discussions with the lessee is necessary to prevent trespass cattle.

Partnerships Objective 12

Continue to collaborate with the Pleasant Valley and Marion schools for a minimum of one field trip or environmental education activity per year.

Strategies

1. Continue to accommodate the Pleasant Valley and Marion schools whenever appropriate and compatible, to enhance their scientific or biological learning experiences.
2. Work closely with the Pleasant Valley and Marion school districts to develop an environmental education manual that fulfills

both the educational requirements of local and nearby students in addition to the vision and goals of the refuge.

3. Continue working with the school board of Pleasant Valley and Marion schools to write grants, etc., that allow the school to participate in environmental education activities on the refuge.

Ray Washtak/USFWS

Students from Pleasant Valley School work with goose nesting structures at the refuge.

Rationale

Environmental education is one of the six top priority public uses that refuges are required to address. Interaction with local schools will aid in environmental education opportunities at the refuge and community support, while promoting interest in future goals and projects on the refuge.

Children located in the Pleasant Valley will be able to further their appreciation for the surrounding environment. In addition, this will help establish community support that will increase interest in and understanding of the refuge and the Refuge System.

Partnerships Objective 13

Work with the Montana Academy staff to collaborate on a minimum of one hands-on project per year for biology students to aid in their biological education as well as benefit refuge resources.

Strategies

1. Allow the Montana Academy to use the refuge for their outdoor biology classes whenever appropriate and compatible.
2. Seek assistance from the Montana Academy staff in areas that may be beneficial to the refuge as well as to students, i.e., tansy ragwort control.
3. Use students to assist with fence removal or various other habitat management projects.
4. Provide one full-time public use specialist to develop, implement, and monitor environmental education programs.

Rationale

Environmental education is one of the six top priority public uses that refuges are required to address. Interaction with the Montana Academy will aid in environmental education opportunities at the refuge and community support, while promoting interest in future goals and projects on the refuge.

Children located in the Pleasant Valley will be able to further their appreciation for the surrounding environment. In addition, this will help establish community support that will increase interest in and understanding of the refuge and the Refuge System.

FUNDING AND STAFFING

Funding levels for the above-described operations and staffing to achieve the refuge vision and goals are described in tables 12 and 13.

Actions, projects, and maintenance needs for the refuge are displayed in tables derived from the RONS and MMS, in appendices K and L respectively.

Table 12. Staffing to carry out objectives and strategies of the CCP, Lost Trail National Wildlife Refuge, Montana

Staffing	*Employee Grade Level*[1]	*Estimated Salary ($)* *(not including cost of employee benefits)*
Supervisory refuge operations specialist	GS-12	56,463
Refuge operations specialist	GS-11	47,110
Wildlife biologist	GS-11	47,110
Outdoor recreation planner (public use specialist)	GS-11	47,110
Law enforcement officer, career-seasonal (0.5 FTE[2])	GS-9	19,468
Administrative support assistant	GS-5	25,697
Maintenance worker (2.0 FTEs)	WG-8	71,564
	Annual Salary Total[3]	314,522

[1]*General Schedule (GS); Wage Grade (WG)*
[2]*FTE=full-time equivalent employee*
[3]*Based on position grade level, rounded to the nearest thousand*

Table 13. Budgetary needs to carry out objectives and strategies of the CCP, Lost Trail National Wildlife Refuge, Montana

Budget Item	*Estimated Expense ($)*
Administration and maintenance facility	1,500,000
Equipment	200,000
Environmental education program	200,000
"Friends group" facility and activities	250,000
Lending library	300,000
Operations (annual supplies, gas, etc.)	56,000
Salary with benefits	390,000
Structure maintenance and improvement	500,000
Vehicles	250,000
Visitor contact station	350,000
Total	3,996,000