

# CHAPTER 5— Implementation of the Proposed Action (Draft CCP)



Bob Danley/USFWS

*A young visitor participates in a refuge educational program.*

This chapter contains the specific objectives and strategies that would be used to carry out the Service's proposed action (alternative B) and reflects the draft CCP for the Lee Metcalf National Wildlife Refuge. The Service recommends this as the alternative that could best achieve the refuge's purposes, vision, and goals while helping to fulfill the Refuge System mission.

If the Regional Director selects alternative B as the preferred alternative, the objectives and strategies presented in this chapter would become the final plan to be carried out over the next 15 years. In addition, the stepdown management plans listed in table 13 (section 5.11 below) would provide implementation details for specific refuge programs.

## 5.1 Summary of the Draft CCP

The rest of this chapter contains the draft CCP—the objectives and strategies for the refuge resources and programs as identified in alternative B, the proposed action. (Refer to sections 3.2 and 3.4 in chapter 3.)

The focus of the draft CCP is to carry out science-based management of the habitat and wildlife associated with the refuge along with complementary visitor services:

- The Service would use the best available science to determine the most effective methods for conserving,

restoring, and enhancing the habitats within the refuge, including grassland and shrubland, gallery and riverfront forests, and wetland impoundments. Providing these habitats for target migratory birds would achieve the purposes of this refuge. A significant part of the restoration proposals would be to control invasive plant species, where possible, and prevent further spread. Grasses and shrubs native to the uplands, including the alluvial fans, would be restored, where appropriate, to provide habitat for native wildlife including grassland-dependent migratory birds. Some wetland impoundments would be removed or reduced in size to allow for river migration or provide restoration sites with an overall long-term goal to restore the gallery and riverfront forest for wildlife that are dependent on riparian areas. Most of the remaining impoundments would be managed to emulate natural conditions for wetland-dependent migratory birds. The Service would provide information to the public on the process and purposes of restoring some of these native habitats.

- The Service would expand and improve the refuge's compatible, wildlife-dependent, public use programs, in particular the wildlife observation, environmental education, and interpretation programs. The visitor contact area and associated headquarters would be expanded into a visitor center, new office space, and a combination conference room and

environmental education classroom. New displays would be professionally planned and produced for the expanded visitor center. Interpretive panels would be located at strategic points on the refuge, highlighting the restoration efforts. These panels would be designed so they could be updated as needed. The refuge would work with the county to designate the public road traveling through the refuge as an auto tour route, which would include pulloffs and interpretation. A seasonal hiking trail would be added and some other existing trails would be improved for wildlife observation and photography and other interpretive and education programs. The hiking trails within the WVA would not be protected from the Bitterroot River's migration. Trails may be relocated if they become impassible. All public use programs would provide visitors with information on the purposes of the refuge and the mission of the Refuge System, ensuring that almost every visitor would know that they are on a national wildlife refuge.

- Increased research and monitoring, staff, funding, infrastructure, and partnerships would be required to accomplish the goals, objectives, and strategies outlined in this chapter.

Sections 5.2 through 5.10 set out the objectives and strategies that serve as the steps needed to achieve the CCP goals for the refuge. While a goal is a broad statement, an objective is a concise statement that reveals what is to be achieved, the extent of the achievement, who is responsible, and when and where the objective should be achieved—all to address the goal. The strategies are the actions needed to achieve each objective. Unless otherwise stated, refuge staff would carry out the actions in the objectives and strategies. The rationale for each objective provides context such as background information, assumptions, and technical details.

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

### TARGET SPECIES SELECTION PROCESS

Early in the planning process, the Service selected three groups of target species that will be supported by the objectives and strategies described under the habitat goals for the Bitterroot River floodplain, wetland impoundments, and grassland and shrubland habitat. Part of this process was to review three separate documents focused on sustaining or recovering species in Montana: the "Montana Intermountain West Joint Venture Plan," "Montana State Conservation Plan," and the "Bitterroot River Subbasin Plan." An initial list was developed based on whether a species either



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*Wood duck is a target species for the Bitterroot River floodplain.*

occurred on the refuge or could occur on the refuge if its preferred habitat was expanded or restored, as indicated under each goal. Almost all of the species selected are recognized in these three documents. The life history needs of over 100 species were examined for similarities and relevance to the proposed goals. The final lists of 16 species were selected based on their ability to represent guilds or because they were good indicators of the quality of a specific habitat type. The habitats that support the migration, foraging, nesting, and migration needs of these selected species should benefit a much broader group of secondary bird species as well as a variety of other wildlife, both migratory and resident. These target species will be monitored for trends in abundance and distribution to evaluate the effectiveness of these proposed actions. The actions described in these three alternatives were evaluated based on their abilities to support these target species.

## 5.2 Goal for the Bitterroot River Floodplain and Associated Wildlife

Manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain to provide healthy riparian habitats for target native species and to educate visitors about the benefits of sustaining a more natural floodplain.

### TARGET SPECIES FOR THE BITTERROOT RIVER FLOODPLAIN

The Service has identified the habitat needs of a diverse group of target floodplain species, including waterbirds, neotropical migrants, and mammals (table 9). Providing for the life history needs of these

**Table 9. Target species for the Bitterroot floodplain and their habitat needs.**

<i>Habitat</i>	<i>Vegetation height and cover</i>	<i>Structural or foraging requirements</i>	<i>Area requirements</i>	<i>Nesting or breeding (after 1991)</i>	<i>Migration</i>
<b>Wood Duck</b>					
Creeks, streams, marshes, beaver ponds	Nests in natural cavities or artificial nest boxes; trees for nest site are >24 inches DBH; cavities average 24 feet or higher aboveground	Freshwater wetlands with an abundance of vegetative cover; small areas of open water with 50–75% cover	Not territorial—priority is adequate cover	X	X
<b>Lewis's Woodpecker</b>					
Riparian woodland with ponderosa pine and cottonwood, logged or burned pine, and snags	Uses brushy understory and ground cover; requires snags for nesting (standing dead or partially dead); nest heights vary between 3 and 171 feet	During breeding, eats free-flying insects and fruit found on service-berry, hawthorn, dogwood, elderberry and sumac	Determined by food and storage-site availability	X	X
<b>Willow Flycatcher</b>					
Riparian woodland with willow and other shrubs and cottonwood; restricted to river and creek corridors	Nests in shrub thickets close to ground (3–5 feet high on average); willow shrubs are favored nesting substrate, but will use other shrubs	Eats primarily insects and occasionally fruit	Wintering home range estimated at 0.25 acre and breeding range at 1 acre	X	X
<b>Vaux's Swift</b>					
Coniferous and deciduous forest; large-diameter hollow trees (dead or alive) and chimneys are favored nesting and roosting sites	Cover not important for nesting; DBH averages 30 inches (17–43 inches); tree height averages 85 feet (30–131 feet); nest height averages 56 feet (30–108 feet)	Forages for flying insects in air over forest canopy and grasslands	Not territorial; nest singly or semi-colonially, when roosting-thousands can roost in a single tree	X	X
<b>Brown Creeper</b>					
Continuous and unfragmented mixed coniferous–deciduous forest, mostly old growth (>100 years); large snags and live trees; high canopy closure and high density of trees preferred	Forages especially on large trees (average >12 inches DBH) and tall trees (>89 feet) with trunks that have deeply furrowed bark that contain higher arthropod densities; nest height ranges between 2 and 45 feet and nest is almost always between trunk and a loose piece of bark on a dead or dying tree in a dense tree stand	Forages on variety of insects and larvae, spiders and their eggs, ants, and a small amount of seeds and other vegetable matter; forages primarily on trunks of live trees and occasionally on large branches, but rarely on the ground	During breeding, average territory size ranges from 0.02 to 0.06 acre; territories break down late in the fledging period	X	X
<b>Hoary Bat</b>					
Summer resident in forested riparian areas and woody wetlands	Roosts on trees 12–40 feet aboveground; dense vegetation above roost preferred	Open-air forager that prefers moths, but also feeds on beetles, wasps, grasshoppers, and occasionally small bats	Solitary with no real defined territory	Unknown	X

Sources: Bull et al. 2007, MFWP 2005, Hejl et al. 2002, Hepp 1995, Montana Bird Distribution Committee 1996, Sedgwick 2000, Texas State Parks and Wildlife 2011, Tobalske 1997.

Abbreviations: DBH = diameter at breast height, X = recorded use on the refuge.

species would provide the natural floodplain habitat diversity and conditions needed not only for these targeted species, but also for a broad suite of other floodplain-associated wildlife. Monitoring would focus on these target species to determine their response to floodplain management actions.

## FLOODPLAIN OBJECTIVE 1

Where channel migration of the Bitterroot River is occurring, do not inhibit the river from establishing natural flow patterns during high flow events, where appropriate, to enhance existing riparian woodlands and provide suitable restoration sites for both gallery and riverfront forest vegetation that could provide breeding, nesting, feeding, or migration habitat for target species (over the next 15 years).

### Strategies

- Remove or do not replace hard points or riprap along the channel banks of the Bitterroot River unless they protect non-Service property or structures.
- Work with engineers and hydrologists, contracting as necessary, to determine and design overflow channels in the north part of the refuge (Ponds 11, 12, and 13) and remove infrastructure to allow for river movements into these channels. Revegetate exposed soils with gallery and riverfront forest species.
- Do not impede the fluctuations and movements of the Bitterroot River within the WVA. Use interpretation, including signage, and environmental education to inform visitors with information about the benefits of this process and the Service's plans to relocate facilities and eroded trails, as appropriate.
- In areas away from overflow channels and gallery and riverfront forest restoration, continue to allow seasonal flows (including backwater flooding into Francois Slough) of the Bitterroot River into and through North Island and Francois Sloughs. File for changes to existing water rights as directed by the Service's water resources division.
- Allow and promote natural regeneration of native gallery and riverfront forests and plant native trees, shrubs, and grasses, where appropriate.
- Monitor and treat new invaders within channels and on the newly exposed soils.
- Monitor the abundance and distribution of target species to determine the success of management techniques, and use adaptive management to ensure that the refuge is using the most effective methods and proven technologies.

### Rationale

The combination of irrigation ditches and associated infrastructure (culverts, water diversion structures), development (bridge crossings, riprapping), and land



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*The erosion caused by meandering Bitterroot River, adjacent to the wildlife viewing area.*

use changes has significantly altered the Bitterroot River's channel form, structure, and movement within the Bitterroot Valley and its floodplain (Heitmeyer et al. 2010). Notably, existing river stabilization structures on the refuge, including frontline levees and riprap placed along the Bitterroot River in the 1950s, altered the river's physical and hydraulic dynamics and character. Ultimately, these structures may be contributing to potential damage on other stretches or off-refuge lands along the river, both upstream and downstream (Heitmeyer et al. 2010).

In addition to the possible impacts caused by infrastructure and land use, the Bitterroot River has an inherently unstable hydraulic configuration and high channel instability in the stretch immediately upstream from and at the Lee Metcalf Refuge. The river in this area is characterized by numerous braided channels that spread over a wide area of the Bitterroot Valley floodplain. Many of these channels are evident on Lee Metcalf Refuge.

Since the 1930s, lateral migration of the Bitterroot River channel has apparently accelerated, and the river is actively attempting to cross the floodplain at the refuge in new pathways, including seasonally shifting primary discharge through the North Island Slough. Lateral migration of the river has been discouraged to date by land interests along the river—including those of the refuge—to protect existing roads, agricultural land, and the railroad bed and trestle on the north end of the refuge. Control of river migration has been attempted by channeling and armoring channel banks with riprap and other materials. Eventually, more channel stabilization would be needed to keep the Bitterroot River channel "in place" because hydraulic dynamics from future high-flow events would continue to destabilize the current river channel configuration and destroy or damage existing physical structures. It is not only practical but preferable to balance the Bitterroot River's natural fluctuations with restoration of native refuge conditions and land use interests.

Riverbank erosion has occurred all along the refuge, and several levees have been breached by the river. This erosion has led to some loss of riparian habitats, a community type that provides some of the most productive wildlife habitat in the State and is home to a wide variety of birds, mammals, reptiles, and amphibians (MFWP 2005). Nevertheless, this type of flooding and erosion enriches the soil and creates the conditions necessary for expanding and sustaining riparian habitats across the refuge's floodplain.

The levees impounding Ponds 12 and 13 have been partially eroded by the Bitterroot River's side channel movements into the refuge through North Island Slough. The best use of these areas would be to remove the structures and allow the river to flood and recede. Current climate change models predict lower precipitation and lower river levels, and these historic flooding events may rarely take place. However, if natural flow patterns were restored—even to some degree—there would be opportunities to restore native habitats, such as riverfront and gallery forest, providing areas for target bird species (table 9). As necessary, the refuge would closely monitor and treat newly exposed soils as the river recedes. Although necessary for cottonwood and willow regeneration, newly exposed soil and channels could also create ideal conditions for the downstream movement and spread of existing and new invasive species. An active monitoring and treatment program would prevent this invasion and encourage native vegetation to outcompete less desirable species.

Several trails in the WVA are also subject to erosion caused by the river's migration and flooding. The riverbank alongside the Metcalf Trail has eroded at least 100 feet in since 2008. It would be impossible to prevent further movement of the river without significant cost and possible damage to other refuge resources. The Service would evaluate relocating established trails if they were to become completely eroded and impassible. New trail designs would only be considered if the new trail would not be eroded by the river's movements or impede river movements.

## FLOODPLAIN OBJECTIVE 2

Reconnect floodplain habitats with the Bitterroot River to allow natural overbank and backwater flooding into and out of the floodplain during high flow events to support and expand the health, diversity, and extent of the riparian woodlands that could provide breeding, nesting, feeding, or migration habitat for target species (table 9) (over the next 15 years).

### Strategies

- Construct wide spillways in or remove artificial levees, roads, and ditches that prohibit overbank and backwater flooding of the Bitterroot River and
- disrupt natural sheet flow into the central floodplain of the refuge.
- Work with engineers and hydrologists, contracting as necessary, to determine and design the best methods available to remove structures, level ditching, and islands that are impeding natural overbank and backwater flooding on the refuge, including Ponds 11–13.
- Improve high water flow west of Ponds 6–10 into and through historical slough and swale channels by removing obstructions, levees, and dams in and across these drainages. File for changes to existing water rights as directed by the Service's water resources division.
- Monitor and treat invasive species as necessary, particularly on newly exposed soils.
- Monitor the abundance and distribution of target species to determine the success of management techniques and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.

### Rationale

The diversity and productivity of the Bitterroot River Valley at and near Lee Metcalf Refuge was created and sustained by a diverse floodplain surface that was seasonally inundated each spring from both flooding of the Bitterroot River and drainage or seepage from surrounding mountain slopes. Occasional overbank and more regular backwater flooding from the river into its floodplain at the refuge historically helped create and sustain communities and basic ecological functions and values of the site. These flooding processes on the refuge are now restricted by levees along the river, levees and dams on constructed wetland impoundments, roads, the railroad bed, and dams or other obstructions on tributary channels.

To restore the floodplain system at the Lee Metcalf Refuge, restoring the capability of the Bitterroot River to overflow its banks and to back water up tributaries and into other floodplain channels is desirable. The seasonal “pulsed” flooding regime provided uninhibited movement of water, nutrients, sediments, and animals between the river and the floodplain and supported life cycle events and needs of both plant and animal communities. Periodic long-term floods are also important floodplain processes that help maintain community dynamics and productivity. For example, overbank flooding deposits silts and nutrients in floodplains that enhance soil development and productivity. Overbank flooding also creates scouring and deposition surfaces critical for germination and regeneration of riparian woodland species, especially cottonwood (Heitmeyer et al. 2010). Backwater flooding provides foraging habitat for pre-spawning native river fish and rearing habitat for larval and juvenile

fishes. Annual backwater flooding recharges water regimes in depressions and shallow floodplain wetlands that serve as productive breeding habitat for amphibians, reptiles, waterbirds, and certain mammals. Subsequent drying of floodplains concentrates aquatic prey for fledgling waterbirds. Collectively, the body of scientific evidence suggests that restoring the hydrologic connectivity between the Bitterroot River and its floodplain at Lee Metcalf Refuge is desirable (Heitmeyer et al. 2010).

The variations in topography and soil created a mosaic of elevations and site-specific hydrology that supported many vegetation and wildlife communities on the Lee Metcalf Refuge. Unfortunately, the topography and flow of water across the floodplain has been altered, initially from land conversion, physical developments, and diversion of water for irrigation and then from construction of water-control infrastructure by the Service in an attempt to create more permanent wetland areas (ponds) for breeding waterfowl. The physical developments on and around the refuge have been detrimental to sustaining the natural functions and processes that made this area so rich and diverse.

Restoration of the physical and biological diversity and productivity of the refuge would require at least some restoration of natural topography, especially reconnecting waterflow pathways or corridors in the floodplain. Restoration of topography and waterflow pathways is important to allow water, nutrients, and animals to move through the system in more natural patterns. Additionally, restoring water pathways can improve both flooding and drainage capabilities to more closely emulate natural hydroperiods that sustained native plant communities (Heitmeyer et al. 2010).

The Service would work with engineers and hydrologists to determine the location, design, and steps needed to effectively restore natural waterflow without damaging other refuge resources or neighboring lands. Some of the options include completely removing levees, breaching them, or constructing a spillway to allow water to pass through a specific area.

One of the areas proposed for restoration is the old residence site on the west-central side of the refuge. This area has several levees that were created to form shallow water ponds. These ponds were abandoned due to an inability to deliver water or because of flooding of the residence due to subsurface waterflows.

There are many levees or berms that are not part of any impoundment. The vegetation on these levees is often a combination of nonnative grasses and invasive species. Keeping these levees and berms could not only inhibit river movements, but it may contribute to the spread of nonnative grasslands and invasive species. Removing these structures, or placing spillways in them, would allow natural backwater flooding and sheet flow to occur, but monitoring backwater areas for invasives would be required. Restored processes

would encourage maintenance and propagation of native habitats of the riverfront and gallery forest.

Ponds 11–13 on the north side of the refuge are difficult to manage. These impoundments have fallen into disrepair due to non-operational water control structures and, more importantly, erosion of the impoundment dikes and levees by the Bitterroot River. Maintaining these ponds would be very costly and not very effective in providing habitat for a variety of target migratory floodplain species. The refuge would work with an engineer and hydrologist to transition this area—which currently contains artificial islands, level ditching, cattail monocultures—into riparian woodlands, persistent aquatic vegetation, and uplands to benefit a variety of wildlife species. Initial steps would be to survey topography and design sustainable side channels of the Bitterroot River. Grading and revegetation would follow.

It would be important that the refuge closely monitor and treat newly exposed soils that would provide ideal conditions for the spread of existing and new invasive species. The refuge would have to implement an active treatment and restoration program to prevent this invasion and encourage native vegetation to outcompete less desirable species.

### **NORTH BURNT FORK CREEK OBJECTIVE (INCLUDING FRANCOIS SLOUGH)**

Within the refuge, reconnect unimpeded flow from North Burnt Fork Creek with flow pathways into the Bitterroot River to reduce creek water temperatures, improve water and nutrient flow, create habitat conditions conducive to native cold-water species and restore riparian woodland habitat that would support target species (within 8 years).

#### **Strategies**

- Based on historical channel information (photos, topographical features), reestablish the Burnt Fork Creek entrance into the Bitterroot River where it is sustainable and conducive for native salmonids.
- Work with an engineer and hydrologist to determine the best route for North Burnt Fork Creek to return to the river, considering the requirements of bull trout. Strategically remove water control structures and other obstructions in the tributary and floodplain channels to allow fish and other aquatic animals to use this riparian corridor.
- Through partnerships, attempt to restore river and stream connectivity off the refuge to reestablish natural fish passage and flow pathways in the creek to its upper reaches.
- Monitor and treat invasive species, particularly on newly exposed soils.
- Monitor the changes in water quality to determine the success of management techniques, and use

adaptive management to ensure the refuge is using the most effective methods and proven technologies.

- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

### Rationale

North Burnt Fork Creek is a mountain and terrace derived tributary to the Bitterroot River. This stream channel has been altered both off and on the refuge through installation of culverts, bridge crossings, and artificial channels and from using the creek to transport water to wetland impoundments. The refuge has installed water control structures to provide fishing opportunities and has impounded water for waterfowl. Undesirable species, such as cattail and reed canarygrass, formed monocultures along the stream, crowding out and preventing the regeneration of native riparian vegetation such as cottonwood, willow, and dogwood.

Removal of water control structures in the WVA and other areas along the creek would deepen and narrow the streambed, allowing the reconnection of natural streamflows to the Bitterroot River. This reconnection would encourage riparian ecological processes to become reestablished, which may include beaver activity. Additionally, flooding and drainage capabilities would improve and more closely emulate natural hydrological regimes that sustained native plant communities.

Newly exposed soil would provide optimal conditions for invasive species encroachment or monocultures of cattails. The refuge would need to treat cattails and other undesirable vegetation, including invasive species, using various techniques such as prescribed fire and other effective mechanical, biological, and chemical treatments. These methods would also be used to prepare areas for native plant restoration, as needed.

To further encourage riparian habitat restoration, the refuge would plant native vegetation, such as willow and cottonwood, on restored sites. It would be important to monitor the stream's response to the removal of structures and other management actions. Monitoring water chemistry (temperature, dissolved oxygen, total dissolved solids), streamside vegetation, and target species response would help to determine the success of management techniques.

### THREE MILE CREEK OBJECTIVE

Reestablish a channel to the Bitterroot River that mimics the historical flow pattern of Three Mile Creek to create habitat conditions supporting native cold-water species (cooler water temperature, riffles, deep pools) and the restoration of riparian habitat (within 12 years). This objective would complement the Bitterroot River side channel restoration proposed for Ponds 11–13.

### Strategies

- Develop contracts as necessary with engineers and hydrologists to determine and design the best methods available to remove structures, level ditching, and islands. Through partnerships, attempt to restore river and stream connectivity off refuge to reestablish natural fish passages and flow pathways in the creek. File for changes to existing water rights as directed by the Service's water resources division.
- Plant and encourage native vegetation (for example, cottonwood or willow) on restored sites to prevent invasive species encroachment as Ponds 11–13 (see Floodplain Objective 2) dry up and overbank and backwater flow patterns reestablish.
- Treat cattails and other undesirable vegetation using various techniques including disking, prescribed fire, chemical application and other effective mechanical, biological, and chemical treatments to control invasive species and prepare areas for native restoration.
- Monitor the changes in water quality to determine the success of management techniques, and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.



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*The Service is proposing to restore unimpeded flow from North Burnt Fork Creek and Three Mile Creek into the Bitterroot River.*

## Rationale

Three Mile Creek is another mountain and terrace derived tributary to the Bitterroot River. Much like North Burnt Fork Creek, this stream channel has been altered both off and on the refuge by the installation of culverts, bridge crossings, irrigation diversions, and artificial channels. This creek contributes a high sediment and nutrient load to the Bitterroot River compared to other tributaries in the Bitterroot watershed (McDowell and Rokosch 2005).

In 1984, three sediment catch pools were built just south of Pond 11 to prevent sediment from entering and filling in Pond 11. The pools were filled to capacity in only 1 year. Then in 1989, as a solution to the sedimentation, Otter Pond was built. The refuge portion of Three Mile Creek was channeled into a bypass directly to the river. Water from Otter Pond was then siphoned under Three Mile Creek to feed Ponds 11-13. Undesirable species, such as reed canarygrass, formed monocultures along the stream, crowding out and preventing establishment of native riparian vegetation such as shrubs and sedges.

Currently, the river's mainstem is directed northward (figure 7), just west of this confluence, and the sediment from Three Mile Creek has created a willow-filled island and beaver ponds within what is now considered part of North Island Slough. Restoring Three Mile Creek to its historical channel would encourage riparian ecological processes to become reestablished. Additionally, overbank flooding capabilities would improve and more closely emulate natural hydrological regimes that sustained native plant communities.

Newly exposed soil would provide optimal conditions for invasive species encroachment. The refuge would need to treat cattails and other undesirable vegetation, including invasive species, using various techniques including prescribed fire and other effective mechanical, biological, and chemical treatments. These methods would also be used to prepare areas for native plant restoration.

To further encourage riparian habitat restoration, the refuge would plant native vegetation, such as hawthorn and dogwood, on restored sites. It would be important to monitor the response of the stream to the removal of structures and other management actions. Monitoring water chemistry (dissolved oxygen, total dissolved solids, and temperature) and streamside vegetation would help to determine the success of management techniques and determine if another method would be more effective.

## RIVERFRONT FOREST HABITAT OBJECTIVE

Restore regenerating and sustaining mechanisms for riverfront forest communities alongside the Bitterroot River that will provide nesting and migration habitat for target species such as willow flycatcher and Lewis's woodpecker.

## Strategies

- Develop a riverfront forest inventory map and compare it with areas where riverfront forest occurred historically. Use this information to determine the most effective and strategic areas for restoration.
- Remove levees, berms, and roads to allow for natural overbank and backwater flooding (see Floodplain Objective 2). These occasional flood events would scour surfaces, deposit sands, and create regeneration sites to restore and sustain riverfront forest vegetation, including cottonwood, along the margins of the Bitterroot River.
- Use prescribed fire and grazing during dry periods to sustain occurrence of grasses and forbs.
- Construct temporary deer exclosures, as needed, to protect newly planted tree areas and regeneration sites.
- Monitor and treat invasive species and promote and restore vegetation native to riverfront forest to provide quality habitat for target species.
- Monitor the abundance and distribution of target species to determine the success of management techniques, and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.

## GALLERY FOREST HABITAT OBJECTIVE

Restore regenerating and sustaining mechanisms for gallery forest communities on higher floodplain elevations (natural levees and benches) in areas with sandy-loam soils, on natural levees, and on other floodplain ridges that have 2- to 5-year flood occurrence intervals in order to sustain and expand nesting and migration habitat for target species such as Lewis's woodpecker, willow flycatcher, and hoary bat.

## Strategies

- Develop a gallery forest inventory map to identify its current extent and historical range, particularly along the west side of Ponds 8 and 10. Use this information to determine the most effective and strategic areas for restoration.
- Change the water management of Ponds 8 and 10 to allow for expansion of gallery forest as appropriate on the west side of these impoundments. Utilize prescribed fire, grazing, and chemical applications to manage cattail encroachment, and sustain the occurrence of grasses and forbs.
- Allow for continued natural regeneration of the shrubland component in the gallery forest (hawthorn, alder, wood's rose, and dogwood) while applying and evaluating proven techniques for promoting the shrubland component within the gallery forest.
- Construct deer exclosures to protect newly planted areas and regeneration sites, as needed.

- To protect restoration sites, monitor and treat invasive species using prescribed fire, chemical applications, and mechanical techniques.
- Seed grasses such as bluebunch wheatgrass and Idaho fescue under and between the trees and shrubs to reestablish ground cover and outcompete noxious and invasive plants.
- Survey and monitor the population and response of forest target species prior to and following enhancement and restoration treatments.

### **Rationale for Riverfront and Gallery Forest Objectives**

Historically the Bitterroot River Valley, which includes the Lee Metcalf Refuge, supported a wide diversity of animal species associated with the interspersed riparian forest, wetland, and grassland habitats. The riparian forest is made up of riverfront forest and gallery forest (Heitmeyer et al. 2010).

Riverfront forest includes early succession tree species such as black cottonwood and sandbar willow that are present on newly deposited and scoured gravelly-sand, sand, and fine sandy-loams near the active channel of the Bitterroot River and in sand-outcrop sites next to floodplain drainages. These sites have high water tables for most of the year and are inundated for short periods during high spring river flows almost annually. Regularly scoured soils provide bare soil sites for seed deposition and subsequent germination and growth of willow and cottonwood (Cooper et al. 1999, Heitmeyer et al. 2010)

Gallery forest is dominated by cottonwood and ponderosa pine and is present on higher floodplain elevations along natural levees and point bar terraces adjacent to minor floodplain tributaries. Gallery forest areas often have woody shrubs such as alder, hawthorn, dogwood, and Wood's rose in the understory and mixed grass species such as bluebunch wheatgrass and Idaho fescue under and between the trees and shrubs. The gallery forests were flooded occasionally by overbank or backwater floods from the river and for short durations in the spring (Burkhardt 1996, Fischer and Bradley 1987, Heitmeyer et al. 2010).

Most wildlife species in these forests were seasonal visitors that used resources provided by spring and early summer pulses of water into the system. Riparian woodlands in the Bitterroot Valley were sustained by fertile floodplain soils and seasonal inundation for generally short periods at about 2- to 5-year intervals. Occasional disturbance mechanisms provided suitable substrates for regenerating tree species and shrubs. Riparian woodlands in Montana generally are in poor condition if the shrub components are not present, most commonly due to overgrazing (Heitmeyer et al. 2010).

Collectively, many landscape and hydrological changes in the Bitterroot Valley since Euro-American settlement have dramatically altered the physical

nature, hydrology, and vegetation communities of the refuge. Prior to Euro-American settlement, the relatively dry climate of the valley and the migration of the Bitterroot River created a diverse mix of communities including riverfront and gallery forest next to the Bitterroot River and floodplain drainages.

In response to the altered ecological processes, there are now reduced areas of riverfront and gallery forest. Restoration and expansion of the riparian woodlands would be a long-term project that would surpass the life of this plan. Ideally, and over time, using prescribed fire, planting native plants (plugs of dominant tree species and shrubs), treating and controlling invasive species, and restoring hydrological regimes would allow for the restoration of these habitats to support target species.

The refuge does not have a complete forest inventory map. Developing this map would help the refuge determine the extent of this native forest and where it occurred historically; in turn, this would help determine the most effective and strategic restoration areas. However, there are some areas that need immediate attention on the west side of the refuge along the river. Removal of levees and roads would allow overbank and backwater flooding into historical forest areas. This action would scour the surface of the soil and deposit fine sediments, creating conditions to promote cottonwood regeneration—a main vegetative component of the riparian woodlands. The refuge would implement prescriptive fire and grazing in forest areas to allow scarifying of pine cones, which promotes germination of ponderosa pine, another component of riparian woodlands.

Other focus areas would be Ponds 8 and 10. The HGM-derived map of vegetation prior to Euro-American settlement shows this area to be a mixture of gallery and riverfront forest (figure 18). Creating these ponds reduced the amount of native forest habitat. Past water level management has also created very large monocultures of cattails that have reduced the amount of open water available to the waterbirds these ponds were intended to support. Returning gallery and riverfront forest to these historical sites would begin to restore a unique and important habitat to this part of the refuge and the Bitterroot Valley, providing new areas for identified forest target species. The Service would draw down water in Ponds 8 and 10, as needed, to allow for this expansion. The ponds would still be managed for open water, but the water table would be lowered and the amount of cattail surrounding these ponds would be reduced to allow for forest expansion. Reducing cattail is most effective using a variety of methods including prescribed fire, grazing, and chemical applications.

It would be important that the refuge closely monitor and treat newly exposed soils. This newly exposed soil would create ideal conditions for the spread of

existing and new invasive species. The refuge would have to implement an active treatment and restoration program to prevent this invasion and encourage native vegetation to outcompete less desirable species. Additionally, erecting deer exclosures or other plant protectors would help protect tree and shrub plantings from being overbrowsed and killed by deer.

## 5.3 Goal for Wetland Impoundment Habitat and Associated Wildlife

Where appropriate, manage wetland impoundments to create a diversity of habitats for target waterfowl, shorebirds, and other associated native wetland-dependent species.

### TARGET WETLAND HABITAT SPECIES

The Service has identified the habitat needs of a diverse group of target waterbird species, including ducks and shorebirds. Providing for the life history needs of these species would provide the natural wetland diversity and conditions needed not only for these target species, but also for an even greater variety of wetland-associated wildlife. Monitoring would focus on these target species to determine their response to wetland management actions.

In the Bitterroot Valley, the Lee Metcalf Refuge is an important refuge for migratory birds during the spring and fall. Waterfowl breeding and brood rearing occurs on Lee Metcalf Refuge with a great variety of waterfowl using the refuge for these life history requirements; however, the refuge is not a major production

refuge. The most important habitat management efforts would focus on providing optimal habitat for foraging and resting during migration. Lowering the water levels would serve to increase food availability by concentrating foods in smaller areas and at water depths within the foraging range of target wildlife. The rate and timing of drawdowns have important influences on the production and composition of semi-permanent wetland plants and invertebrates that provide protein-rich food resources (USFWS 1991) for each of these target bird species.

### WETLAND IMPOUNDMENT HABITAT OBJECTIVE 1

Over the next 15 years, manage water levels on 628 acres to emulate natural and seasonal water regimes including natural increases in waterflow in the spring followed by rotational drying in the summer and fall. Managed properly, these wetland impoundments, or ponds, could provide a variety of wetland conditions to meet the life cycle requirements of target wetland-dependent species (table 10).

### Strategies

- Maintain or replace the water management structures in Ponds 1–6, Ponds 8 and 10, and Otter Pond. The remaining wetland impoundment structures would be maintained as needed.
- Water level management of Pond 8, Pond 10, and Otter Pond would be changed to a more seasonal water regime that emulates natural increases in distribution and depth in spring, followed by drying in summer and fall to encourage the restoration of wetland and shrub habitat. While drawing wetlands down, exposed shorelines would be monitored and treated to prevent invasive species and monotypic stands of cattails from becoming established. File

**Table 10. Wetland impoundment target species and their habitat needs.**

<i>Species</i>	<i>Spring migration</i>	<i>Forage depth</i>	<i>Fall migration</i>
<b>Birds</b>			
American wigeon	Mid-March to mid-April	5–8 inches	Mid-November to mid-December
Redhead	Mid-March to mid-April	6–30 inches	Mid-November to mid-December
Marbled godwit	Early May to early June	Mudflats, 0–4 inches	Early July to early September
Long-billed dowitcher	Mid May to mid-June	Mudflats, 0–4 inches	Early July to early September
American bittern	May to June	Mudflats, 0–4 inches	July to September
<b>Amphibians</b>			
<i>Species</i>	<i>Habitat</i>	<i>Breeding</i>	<i>Active period</i>
Boreal toad	Wide variety; survive best in shallow ephemeral ponds to avoid American bullfrog predation	April to mid-July	April to October

Sources: Gratto-Trevor 2000, Lowther et al. 2009, Mowbray 1999, MFWP 2005, Montana Bird Distribution Committee 1996, refuge data, Takekawa 2000, Texas State Parks and Wildlife 2011, Woodin et al. 2002.

for changes to existing water rights as directed by the Service's water resources division.

- Prevent invasive species encroachment into newly exposed soil using various mechanical, biological, and chemical treatments to control invasive species and prepare areas for native restoration.
- Manage, or maintain, a hemi-marsh condition of the ponds to create a ratio of 50:50 open-water to emergent vegetation (such as bulrush and cattail), providing optimal breeding and brood rearing habitat for diving ducks and dense emergent vegetation over water 2–8 inches deep for bitterns.
- Manage or maintain dry ground with tall grasses and mixed herbaceous cover for dabbling ducks.
- Provide short, grassy-cover uplands—well away from wetland edges—for shorebird nest sites.
- Emulate long-term patterns of drier conditions in floodplain wetlands in most years including periodic complete drying in some years and occasional prolonged flooding in a few years.
- To determine the water-level targets needed to provide adequate food, cover, and nesting substrate for target waterbird species, install staff gauges in all wetland impoundments.
- Determine the feasibility and methods for restoring the historical flow of the side channel of the Bitterroot River and Three Mile Creek through Ponds 11 through 13 to restore riparian habitat (see Floodplain Goal) and reestablish unimpeded flow to the river.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

### Rationale

Wetland impoundments on the refuge were constructed and developed to provide open water habitat for migratory waterfowl and shorebirds. However, past management has not consistently emulated seasonal or long-term dynamics of water levels that naturally occur in wetlands. Instead, water regimes have consisted of drawdown in the spring to provide mudflats for shorebirds, followed by flooding the ponds for nesting waterfowl. The ponds would then stay full during the summer until early fall with drawdown again for shorebirds, followed by flooding for migratory waterfowl and to enhance waterfowl hunting opportunities. This water regime occurs only on some ponds while others—notably Pond 6, Pond 8, Pond 10, and Otter Pond—are usually full year-round. These permanently flooded wetlands have experienced algal blooms, encroachment of cattails, and it is assumed, low productivity and nutrients. Overall, it is suspected that the refuge's past water regime has not provided the optimal habitat for target wetland species.

Researchers from the University of Montana have been investigating the contamination of mercury on the refuge and elsewhere in Montana. It is theorized that there has been bioaccumulation of methyl mercury as a result of stagnant water, and mercury concentration in fish on the refuge has been high (Langner et al. 2011). It is possible that mercury may have also contributed to the decline of osprey populations over the years and has prompted concern of contamination in osprey eggs, making some non-viable (Heiko Langner, personal communication, professor of biological sciences, University of Montana, November 2010 and February 2011).

To provide optimal habitat, increase nutrient uptake and plant productivity, and decrease methylation of mercury, the Service would manage Ponds 1–6, Pond 8, Pond 10, and Otter Pond for a more seasonal and annually dynamic water regime by increasing water levels in spring and rotational drying in summer and fall. Rotation of ponds with drawdowns would depend on annual habitat objectives and responses of target wildlife to water regimes. To manage and move water more effectively, the refuge would need to replace old, dilapidated water management structures as well as structures that are not effective due to size. Some of the existing structures are extremely unsafe and require more than one person to operate. Replacement of these structures would provide more cost effective and safe operations. It would also be important for the refuge to manage cattails and prevent their further encroachment into open water. Cattail is very difficult to control, and management would require a variety of methods such as prescribed fire, grazing, and chemical application. It would be important that the refuge closely monitor water levels and quality to evaluate the effectiveness of any water regime. Documenting the response of target species would also help evaluate the effectiveness of this management program while using adaptive management to ensure that the refuge is using the most effective methods and proven technologies.

### WETLAND IMPOUNDMENT HABITAT OBJECTIVE 2

Where appropriate, reduce the area of more permanently flooded wetland impoundments and persistent emergent vegetation to restore native plant communities, such as gallery forest, while improving the diversity and productivity of the remaining impoundments for the benefit of target waterbird species (over the next 10 years).

### Strategies

- Remove levees, ditches, and water control structures from abandoned wetland impoundments to facilitate the restoration and expansion of the gallery forest (Ponds 7, 7a, 7b, 9, and D) and native grassland (Pair Ponds and Potato Cellar Pond) habitat.



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*Restoring and expanding gallery and riverfront forest would enhance habitat for species including brown creeper and hoary bat.*

- Reduce Pond 8, Pond 10, and Otter Pond in size, as appropriate, to allow for the restoration of gallery forest habitat. File for changes to existing water rights as directed by the Service's water resources division.
- Treat exposed shorelines to prevent invasive species and monotypic stands of cattails from becoming established prior to restoration. Use a variety of management techniques such as prescribed fire, chemical application, livestock grazing, and mechanical means.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

### Rationale

Refuge lands around and within Ponds 8 and 10 were once a mixture of riverfront and gallery forest, but today this habitat is much less extensive here and in the Bitterroot Valley. Creating these ponds reduced the amount of forest habitat and created open water. Over time, these ponds have been covered by large areas of cattails which reduced the amount of open water available for waterbirds. Managing these permanently flooded ponds for open water is not the highest and best use of this habitat type due in part to a lack of nutrient cycling, a reduction in early successional submergent vegetation, and the spread of monotypic cattail stands. These stands are difficult to control and provide minimal habitat for target wildlife species.

The best use of this area is to restore and expand the gallery and riverfront forest in these historical sites, thereby enhancing the habitat needed by native forest target species such as brown creeper and hoary bat. The Service would draw down water in Ponds 8 and 10 and Otter Pond to allow for this expansion. The ponds would still be managed for open water, but the amount of cattail surrounding these ponds would be reduced to allow for forest expansion and restoration.

Some of the most effective methods for reducing cattails are prescribed fire, grazing, and chemical applications; it is important to use the right treatment at the right time to be effective and prevent further spread. In addition to reducing the ponds in size, the refuge would replace the water control structures on Ponds 8 and 10 to allow more effective, productive water level management on the remaining wetland area.

There are several old and abandoned ditches and levees throughout the refuge from former attempts to impound water. These attempts have failed due to lack of water availability and the inability of the soil to hold water. These levees, ditches, and water control structures would be removed to facilitate the restoration of gallery forest in Ponds 7, 7a, 9, and D and native uplands in Pair Ponds and Potato Cellar Pond.

### GRAVEL PITS OBJECTIVE

Use the gravel pits—created when gravel is harvested east of the Bitterroot River—to provide nursery habitat for amphibians such as the boreal toad, a State species of concern, and the Columbia spotted frog.

### Strategies

- Remove vegetation and soil from the artificial gravel pits to restore the desired habitat conditions for amphibians, as appropriate. If necessary, harvest gravel October through March, avoiding disturbance and displacement of any amphibians during breeding season.
- Manage these old gravel pits as ephemeral pools to discourage the American bullfrog, an invasive predator of amphibians and other desirable native species.
- Survey amphibian populations and monitor the response of amphibians to determine the success of management techniques. Adapt management techniques to ensure the refuge is using the most effective methods, research, and proven technologies.

### Rationale

Since the 1990s boreal toads have been declining throughout the Rocky Mountains. In Montana, the species status is uncertain, but it has been listed by the State as a species of concern. There are relatively few known breeding populations.

Throughout its life cycle, the boreal toad utilizes a wide variety of habitats including streams, wet meadows, beaver pools, marshes, and lakes. They prefer shallow areas and edges with mud bottoms. These gravel pits have become shallow, disturbed gravel ephemeral pools—desirable breeding habitat for these toads. In 2001, researchers on the refuge found 20,469 eggs from a single female in a refuge gravel pit. This was the largest clutch ever reported for this species (Maxwell et al. 2002).

It is suspected that breeding boreal toads are limited to just a few areas on the refuge, like the gravel pits, due to American bullfrog predation, an invasive species that has been introduced throughout the western United States. Introduced in Montana sometime before 1968, the bullfrogs have been documented all along the Bitterroot River and extensively throughout the refuge. This species is so widespread throughout the Bitterroot Valley, it is almost impossible to control through treatments other than removing their desired habitat, which affects native species. Extremely territorial, they are voracious predators that feed on young birds, fish, snakes, crayfish, invertebrates, and other amphibians. This feeding behavior allows them to displace native species easily (Werner et al. 2004). They have been implicated in extirpations of amphibians and declines in waterfowl production (State of Montana 2011). Any suitable pond habitats available for native amphibians are typically occupied solely by American bullfrogs.

The American bullfrog is highly aquatic and spends much of its life in warmer permanent water. As the gravel pits are fairly shallow and ephemeral in nature, they experience dry periods. This hydrology is not conducive to the life cycle of the American bullfrog. The refuge would continue to manage these old gravel pits as ephemeral pools to discourage American bullfrogs. This would serve to maintain, if not promote, boreal toad populations. Columbia frogs have similar habitat needs as the boreal toad; however, they prefer emergent and aquatic vegetation. Removing too much of this vegetation for boreal toad larval habitat may impact the other native frogs that use these gravel pits.

## 5.4 Goal for Grassland and Shrubland Habitat and Associated Wildlife

Create the conditions that will allow for the restoration, maintenance, and distribution of native grassland and shrubland species (such as rabbitbrush, needle and thread grass, Junegrass, and hairy golden aster) to provide healthy lands for a diverse group of target native resident and migratory wildlife species and to educate visitors about the historical plant and animal diversity of the valley.

### TARGET GRASSLAND AND SHRUBLAND SPECIES

The Service has identified the habitat needs of a diverse group of target upland (grassland and shrubland) species (table 11). Providing for the life history needs of these species would provide the natural upland diversity and conditions needed not only for these targeted



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*The bobolink is a target species for the grassland and shrubland areas.*

species but an even greater variety of upland-associated wildlife. Monitoring would be focused on these target species to determine their response to upland management actions.

### GRASSLAND AND SHRUBLAND HABITAT OBJECTIVE

Reduce the presence of invasive species to facilitate the restoration, maintenance, and distribution of native grasslands and shrublands in higher floodplain elevations and terraces and on alluvial fans (over the next 10 years).

#### Strategies

- Use Service staff and equipment—possibly in combination with cooperative farming—to plant annual grain crops (including glyphosate-tolerant crops) to eliminate invasive species, including the seedbed, and to prepare an area for restoration to native plant species (over 5–10 years).
- As appropriate, keep some fields fallow using repeated disking or chemical applications to continually treat and reduce invasive species. Some fields may also be planted to winter wheat to reduce erosion from wind and runoff.
- Use small tame grassland sites to determine the best methods to restore native plants and shrubs on the refuge both with and without irrigation.
- Continue to implement and evaluate tested techniques for reducing cheatgrass.
- Use fire, grazing, seeding, and other proven techniques to facilitate the spread and distribution of remnant native species into areas surrounding existing native grassland and shrubland sites.
- Systematically convert tame grassland areas to native species of grass, forbs, and shrubs using direct seeding, irrigation (where possible), prescribed fire, and other mechanical, chemical, and biological methods.

**Table 11. Target species for the grassland and shrubland areas and their habitat needs.<sup>1</sup>**

<i>Habitat</i>	<i>Vegetation height</i>	<i>Vegetation cover</i>	<i>Litter and/or residual cover</i>	<i>Area requirements</i>	<i>Nesting or breeding (after 1991<sup>2</sup>)</i>	<i>Migration</i>
<b>Western Meadowlark</b>						
Open, treeless areas with widely dispersed shrubs	Varies—shortgrass prairie to mixed and tallgrass prairie	Nest sites in grass clumps or next to prickly pear	Abundance is positively correlated with litter depth	5–32 acres depending on vegetation height; more abundant on interior plots >656 feet from edge	X	X
<b>Bobolink</b>						
Mixture of grasses and broad-leaved forbs	2–6 inches	Nests beneath the shade of forbs; no nests found where grass is only concealment	Density is higher in areas with low total vegetation cover but with high litter cover (hayfields >8 years old)	2–4 acres depending on habitat quality; on fields >74 acres, there are more than twice the number of males than on fields <25 acres	X	X
<b>Grasshopper Sparrow</b>						
Idle grasslands with clumped vegetation interspersed with bare ground.	Intermediate, >4 inches	Bird numbers are positively correlated with percent grass cover (the more cover, then the more birds)	Moderately deep litter and sparse cover of woody vegetation	Average size is <5 acres but prefers 20–74 acres; more abundant on interior plots >656 feet from edge		X
<b>Brewer's Sparrow</b>						
Considered a sagebrush obligate species; moderate shrub cover	2–5 feet	>10% average shrub cover; abundance decreases as shrub cover falls below 10% and over 50%; nests on shrubs 9–75 inches in height	No information	Usually 1–5 acres		X

<sup>1</sup> These species do not currently nest on the refuge in great numbers, but with restoration of these desirable habitat qualities, it may allow them to become reestablished.

<sup>2</sup> Refuge data.

Sources: Dechant et al. 2002a, 2002b; Martin et. al 1995; MFWP 2005; Montana Bird Distribution Committee 1996; Texas State Parks and Wildlife 2011; Walker 2004.

Abbreviation: X = recorded use on the refuge.

- Restore intermittent and seasonal water regimes to higher elevation sites within the floodplain and restore patterns of sheet flow surface water movement across the sites by removing unnecessary roads (figure 8), ditches, levees, and other infrastructure.
- Based on soil type, convert higher elevations of current impounded wetlands (that is, Pair Ponds and southwest corner of Field S–1) to native grassland and shrubland by removing levees and water control structures and restoring seasonal water regimes. Seed tame grassland fields with nonnative grasses (not noxious) to outcompete the noxious and invasive weeds. Once these are established, interseed native grasses, forbs, and shrubs.
- Due to a lack of irrigation and moisture, use native seed that can be germinated with minimal moisture.
- Where possible, harvest native seed from plants found on the refuge.
- Based on historical frequencies and the habitat requirements of target species, provide occasional disturbances from fire, mowing, or grazing to recycle nutrients and regenerate grass, shrub, and forb species.
- As saline soils require a different seed mix and management, determine where these soils exist and map them in RLGIS.
- Monitor trends in abundance and distribution to evaluate the effectiveness of these proposed actions.

#### **Rationale**

Soil maps reveal that most uplands on the refuge were historically covered with grasses and some scattered shrubs. Some areas experienced occasional flooding and



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*Service equipment would be used to plant annual grain crops to eliminate invasive species.*

had more wet grassland communities interspersed with herbaceous plants such as smartweed and sedges. By contrast, higher floodplain terraces, slopes, and alluvial fans included mixed wet and upland-type grasses and shrubs such as rabbit brush, sage, needle and thread, and Junegrass (Heitmeyer et. al 2010). These uplands were altered by farming and agricultural practices. Very little, if any, native grassland and shrubland was intact when the refuge was established. Some of these agricultural and tame grass fields are heavily infested with invasive species and provide minimal habitat value to upland wildlife, such as grassland birds. Since refuge establishment, the uplands have continued to undergo various management techniques, and there has been no long-term management approach due to a lack of management plans. Since 1873 the soils in these uplands have been altered and disturbed by farming and agricultural practices; they have also been affected by the change in system hydrology due to irrigation practices, impoundments, roads, and levees (Graham 2009). While the refuge retired these tame grasslands and rested them for many years, invasive plants such as spotted knapweed, cheatgrass, and Canada thistle have become widespread in these areas. This has reduced the tame grasses that can provide some habitat value for grassland nesting birds.

There are many challenges to restoring the uplands. Restoration would be costly and time consuming. To begin restoration, the refuge would first focus on treating and eliminating invasive species and testing restoration techniques in small patches of tame grassland sites. Since many of these areas do not have irrigation, it may be challenging to germinate some native grassland seed. Many of the upland field soils receive no moisture or shade from the drying sun. This has resulted in a hard soil cap that is almost impossible for native vegetation to take root in and seed successfully. Grazing or disking may help to break up this soil cap to allow for seeding.

Treatment and restoration would be accomplished through a variety of methods including chemical applications (using the Service's approved chemicals only), cropping for multiple years prior to seeding with natives, mowing, grazing, prescribed fire, and direct planting. Effectively controlling invasive species may require using several of these methods (see section 5.5, "Goal for Invasive and Nonnative Species").

To reduce the invasive weed seedbed, formerly disked and farmed fields with considerable amounts of invasive species would be planted to small grains for several years. Using herbicide-treatable seed and applying herbicide would reduce the weed seedbed that has built up in these soils for years. The small grain crops would also provide an interim wildlife food source for a number of migratory birds and resident wildlife. Some fields would also be kept fallow and disked at strategic times when invasive plants begin to grow. This farming would stimulate the weeds to grow and then they would be mowed and, in some cases disked, prior to seeding. Winter wheat could be used on these fallow fields to reduce erosion from wind and runoff. These fields would be disked again in the spring. Once the resprouting of invasive plants is reduced (after 4–7 years), restoration to native plants would begin and soil disturbance would cease. Upland Fields I–1 through I–7 could potentially be irrigated by a wheel line (figure 7). However, the wheel line is expensive and time consuming to repair and operate. The refuge would use irrigation where it would be beneficial for the transition from small grains to native grasslands. Many of the former agricultural fields are dominated by cheatgrass and smooth brome. Upland Fields S–1 and S–2 are subirrigated units with a high water table that keeps the soil somewhat moist. These fields have more of a mixture of grasses but still have considerable invasive species. Canada and musk thistle are rapidly invading these fields in the south part of the refuge.

Other potential treatment and restoration sites include formerly impounded areas and proposed restoration sites where the Service would remove levees, berms, and water control structures by the old residence site; Ponds 7, 7a, 9, and D; and Pair Ponds (see section 5.3, "Goal for Wetland Impoundment Habitat and Associated Wildlife," and figure 7).

## 5.5 Goal for Invasive and Nonnative Species

Prevent, reduce, and contain the invasion and spread of noxious, invasive, and harmful non-native species within the refuge while working with partners to address off-refuge infestations within the surrounding landscape.

## NEW INVASIVE SPECIES OBJECTIVE

Within 5 years, establish a baseline inventory of all invasive plants including noxious weeds for the refuge to develop thresholds or triggers for management actions and priority management areas.

Prevent, monitor, and treat all new invaders or small infestations for early detection and rapid response (for example, blueweed, hoary alyssum, and Dalmatian toadflax) to prevent establishment and additional management burden for invasive species.

### Strategies

- Recruit one biological science technician to coordinate the IPM program.
- Continue to map known locations of early invaders and continue to update the database as areas are treated.
- Train and/or certify employees and cooperators (including the Service's strike team) in invasive species identification, mapping techniques, mechanical techniques (shovel, hand pulling, and netting) and chemical application.
- Prioritize treatment in those areas where restoration is occurring and in heavy public use areas.
- Through partnerships, determine the presence of known and new harmful wildlife and insect species and treat them as needed. Through partnerships, develop a program to treat and monitor off-refuge sources of early invaders.
- Actively include volunteers, cooperators, and community support groups in new invader treatment and restoration programs.
- Develop a partnership with MFWP and Ravalli County to monitor aquatic invaders.
- Use geographic information system (GIS) technologies to map treated sites and monitor and retreat areas to prevent reintroduction and spread.

## ESTABLISHED INVASIVE SPECIES OBJECTIVE

Reduce infestations of Canada thistle, spotted knapweed, common tansy, houndstongue, reed canarygrass, cheatgrass, and musk thistle by at least 20–30 percent (measured by canopy cover) over 15 years. Reduce infestations of tall buttercup, yellowflag iris, leafy spurge, St. Johnswort, oxeye daisy, yellow toadflax, and common bugloss on the refuge by at least an average of 45–50 percent (measured by canopy cover) over 15 years.

### Strategies

- Using RLGIS, continue to monitor invasive species distribution and abundance and use this information to prioritize treatment, monitor treatment sites for effectiveness, and re-treat as needed.

- Train and/or certify employees and cooperators (including the Service's strike team) in invasive species identification, mapping techniques, mechanical techniques (shovel, hand pulling) and chemical application.
- Monitor and re-treat areas to reduce patch sizes and to prevent reintroduction.
- Continue to use partnerships to treat known invasive species areas, including off-refuge sources of invasive plants.
- Expand capabilities to treat and restore identified priority areas to create contiguous blocks of native habitat for native wildlife species.
- As soil is disturbed for restoration and management activities, treat these areas for invasive plants and restore them to desirable or native species.
- Only purchase gravel for the refuge that is certified weed-free.
- Review and update the IPM plan.
- Through partnerships, attempt to prevent the re-invasion of treated areas from off-refuge sources.
- Actively involve volunteers and community support groups in education and outreach to increase awareness and prevent establishment of invasives.
- Work cooperatively with the Whitetail Golf Course, located within the refuge boundary, to address invasive species that can be transported to the refuge.

## Rationale for New and Established Invasive Species

Due to changes in the refuge's landscape—including conversion of native habitat to agriculture (prior to refuge establishment) and the advancing of nonnative species across the landscape—the refuge is infested with at least 15 invasive plant species. These invasive species are so widespread that the refuge is challenged in fulfilling its wildlife conservation mission with respect to biological diversity and biological integrity.

These invasive plants can displace native vegetation over large areas and form nearly monotypic stands in the absence of management—accordingly, they threaten native biodiversity (Bedunah 1992, Hutchison 1992). The control or elimination of invasive plants on Service lands would comply with State and Federal laws for invasive and noxious species, including all Service policies pertaining to chemical treatments.

The treatment of weeds requires two different tactics. The first, Early Detection and Rapid Response, focuses on treating new invaders to prevent establishment, which would add to the existing management burden. New invaders are species that are present in small infestations or which have recently been documented on the refuge and are not widespread or well documented. The second tactic involves continual treatments to reduce the size of larger, established

infestations. These areas would be targeted repeatedly in multiple-year treatment plans. All invasive species treatments would require monitoring to measure their effectiveness and allow adaptive management as necessary.

Invasive plant management requires baseline information of size, canopy cover, location relative to priority wildlife habitat areas, and rate of spread to be able to determine the most cost-effective management strategies. An inventory would help prioritize management areas and strategies for eliminating new and isolated infestations, containing them, or reducing larger infestations. Using IPM techniques, the refuge would develop both short- and long-term plans to target and reduce the low, medium, and high ranking infestations of weeds. Montana Department of Agriculture ranks invasive noxious weeds on the degree of infestation and threat to the State. Using these rankings and the degree of threat to refuge lands, the refuge has developed high, medium, and low rankings for treatment. High ranking species are those that are just arriving on the refuge in very small infestations—that is, new invaders. Targeting these species before they become more established is critical. Medium ranking species are those that are more abundant and a bit more established than high ranking species. Finally, low ranking species are those that are well established and cover a lot of acreage, making their control and eradication more challenging, much more costly, and often less successful than smaller infestations.

Controlling invasive species must start on the ground level with education and training because prevention is the most cost-effective management method. Employees, volunteers, and cooperators would be trained in species identification including how to identify new invaders. Each would be trained on how to treat invasive species and which technique (chemical, mechanical, biological, or cultural) is most effective for each species, including timing and duration.

Employees travel all around the refuge, and thus they are highly likely to transport weeds; therefore, the refuge would make sure that all employees can identify weeds and at least one employee maintains a pesticide applicator's license. Steps would be taken to reduce the probability of transporting weeds, such as washing equipment before transporting it to another location. Additionally, any dirt work that is performed would be immediately followed by reseeding of desired species and treatment of invasives.

Infestations of invasive species from adjoining lands have increased in recent years. The refuge would continue to develop its partnership with the Ravalli County Weed District to provide education to adjoining landowners on weeds and their detrimental effects on habitat. A program would be developed to treat and monitor off-refuge sources of new invaders.

As more established and larger infestations are targeted, such as those in upland fields, focus areas would be developed to maintain consistent treatment and monitoring over several years in one area to prevent reintroduction of invasive species. The refuge would recruit volunteers and youth groups for this effort.

Invasive species treatment is an important step in habitat restoration; however, once native plant species become established, they should resist reinvasion.

## 5.6 Goal for Research

Pursue and maintain compatible research projects that would provide information on refuge resources and address refuge issues to assist management in making decisions based on the best available information and science.

### RESEARCH OBJECTIVE

Identify and support research projects that substantially benefit the refuge and species conservation and management (for example, floodplain restoration, target species studies, and public use).

### Strategies

- Evaluate all current research projects to determine their value in addressing refuge management objectives and concerns.
- Focus wildlife research on assessments of species-habitat relationships.
- Identify, design, and conduct issue-driven research and work with universities to develop senior thesis projects, graduate projects, or other research proposals that would address identified issues or provide useful data for management actions and adaptive management. Continue to participate with other Service divisions and the State in researching wildlife diseases on the refuge.



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*A bird on Lee Metcalf Refuge is banded for research purposes.*

- Evaluate impacts on both ground and surface water quality from off-refuge water sources including supply ditches, creeks, and other public inputs (for example, subdivisions, septic systems, and underground tile). Continue to participate in the Montana Bureau of Mines and Department of Environmental Quality research on ground water quality impacts.
- Work with partners, including universities, to research methyl mercury contamination and the potential correlation with the osprey population on the refuge.
- Work with partners to provide opportunities to research the best methods and net effects of restoring refuge habitats, particularly gallery and riverfront forest, and reconnecting waterways to the Bitterroot River.
- Complete a forest inventory (baseline) and upland inventory (baseline) prior to major restoration activities to better understand and monitor the response of those vegetative communities to restoration efforts and other management actions.
- Investigate the relationship of how water moves through the refuge by recording data such as the arrival of irrigation water, ground water movements, water level management, and the fluctuating water levels of the Bitterroot River.
- Through partnerships, investigate the impacts and monitor changes to refuge habitats and wildlife as a result of climate change. Use these results to adapt refuge management programs to the changing environment.
- Seek out grant opportunities to fully or partially fund research projects.
- Use an adaptive management approach to incorporate ongoing research and monitoring results into management options and decisions.

### Rationale

Past research conducted on the refuge has been beneficial in understanding resources and making management decisions. However, no concerted effort has been made to design a research program based on the refuge's most pressing issues or to provide missing data for effectively managing and restoring habitats. The habitat-based goals and objectives in this CCP would form the basis for establishing research and monitoring priorities for the refuge. The restoration proposals would provide a number of research opportunities to both develop restoration methods and study their effects.

To ensure that research proposals address refuge issues and inform management decisions, research proposals would be evaluated to determine if they support refuge research objectives and needs. The refuge would also present research opportunities to

other partners such as universities. Partnerships are critical for achieving the research goal and objectives. Cooperative efforts—such as shared funding, lodging, vehicles, equipment, knowledge, and expertise—are needed to accomplish research projects.

## 5.7 Goal for Cultural Resources

Provide opportunities for visitors to learn about the unique glacial, Native American, and Euro-American history of the Bitterroot Valley while maintaining and protecting the integrity of the refuge's cultural and historical resources.

### CULTURAL RESOURCES OBJECTIVE 1 (PROTECTION)

Through partnerships, systematically develop a comprehensive cultural resource inventory for the refuge, giving priority to proposed habitat restoration sites, and preserve and protect all known cultural resources while ensuring future activities comply with Section 106 of the National Historic Preservation Act.

#### Strategies

- Work with the zone archeologist, contractors, local tribes, the State Historic Preservation Office, universities, and other partners, to start developing a comprehensive cultural resource inventory.
- Use the Montana statewide cultural resource inventory list to determine sensitive sites before conducting activities (such as construction or excavation) that may disturb these sites.
- Document discovered cultural resource sites and ensure their protection.
- Continue to comply with Section 106 of the National Historic Preservation Act before starting projects.



Volunteers help restore the Whaley Homestead, which is listed on the National Register of Historic Places.

- Collaborate with universities and anthropology students looking for projects and inventory opportunities.
- Develop a partnership with the Native American studies program at the Salish Kootenai College to better understand the significance and cultural history of the refuge area to the Salish and other tribes.

### Rationale

The Bitterroot Valley has a rich history and a dynamic culture. Ideally, a comprehensive inventory would help better describe that history on the refuge and ensure the protection of cultural resources. However, these types of inventories are time consuming. Throughout the life of this 15-year CCP, refuge staff would work with partners and the regional archaeologist to begin documenting cultural sites, focusing first on any areas proposed for restoration or other developments.

Prior to Euro-American settlement, the Salish people called this valley home for several centuries, and literature shows that there were several Salish campsites on the refuge. Within decades of the passage of Lewis and Clark through the Bitterroot Valley in 1805 and 1806, other Euro-Americans followed. The first Euro-American settlers were fur traders who built a fort and later Jesuit priests who built a mission. The area surrounding the mission became the oldest community in Montana: what is now the town of Stevensville. As more Euro-Americans settled in the valley, the land and waters that had provided the Salish people with their traditional supplies and foods, such as the bitterroot plant, were converted to grazing and agriculture. In 1891, the United States Government relocated the Salish people to a reservation in the Jocko Valley. Since that time, almost all of their traditional sites for gathering native plants in the Bitterroot Valley have been developed.

The arrival of Euro-American settlers forever changed the landscape and the uses of this valley from traditional harvesting of native plants and wildlife to intensive agriculture. One of the earliest homesteads in the valley was the Whaley Homestead, located on the refuge and listed on the National Register of Historic Places. This homestead was established by Indian Agent Peter Whaley in 1885 and survives as an outstanding example of frontier architecture. Weatherboard siding conceals a massive, complicated understructure of square-hewn logs. The Service would continue to weatherproof and seal this structure to prevent physical deterioration from climate and animals.

Federal laws and policies mandate the identification and protection of cultural resources on Federal lands. Section 106 of the National Historic Preservation Act requires Federal agencies to consider the effects on cultural resources before conducting any Federal action. Without a complete inventory, the refuge's identification of all cultural resources is incomplete. Until

the inventory is completed, the staff would continue to work with the regional archaeologist and State Historic Preservation Office on a case-by-case basis to evaluate projects with the potential to cause impacts.

### CULTURAL RESOURCES OBJECTIVE 2 (INTERPRETATION)

Through partnerships, develop a multimedia education and interpretation program that provides visitors with information about the unique history and culture of the Bitterroot Valley and the refuge. Topics would include the Salish, Pend d'Oreille, and Nez Perce tribes; Lewis and Clark expedition; Euro-American settlement; and the Whaley Homestead. These displays and programs would also highlight the effects—both positive and negative—of these peoples, events, and land uses on the resources and ecology of this area.

### Strategies

- Work with tribal, State, and other partners to create professionally planned and produced displays at kiosks and at the expanded visitor center that interpret the unique culture and early history of the refuge and the Bitterroot River Valley, including the traditional uses of native plants.
- Partner with volunteers and other interested organizations to restore and interpret the Whaley Homestead site. Once restored, consider creating a visitor contact area and history displays, including period furniture.
- Working with Salish Cultural Committee, incorporate traditional Native American place names and the history of place names in interpretive signage, as appropriate.
- Work with refuge partners to determine what degree of interpretation and accompanying restoration is needed for the Whaley Homestead.
- Develop a set of education kits highlighting the unique history of the refuge and the Bitterroot Valley.
- The refuge would continue to identify and interpret historical and nationally designated trails that pass through the refuge including the Nez Perce (National Historic Trail) and Ice Age (National Geologic Trail).

### Rationale

Cultural resources interpretation communicates important messages about the area's history, context, and resources to diverse audiences. A tremendous opportunity exists to work with partners, including the Confederated Salish and Kootenai Tribes culture committee and other State and Federal agencies, to develop a comprehensive interpretive program that adequately describes the significance and history of this valley and the refuge. Thousands of Native Americans

once lived throughout the valley, although many of their traditional sites have been lost to development. The refuge contained many of the resources that would have been needed to live and survive, including the Bitterroot River and native plants; however, no known traditional sites have been identified on the refuge. The refuge and the surrounding Bitterroot Valley also have a rich history of Euro-American settlement, including the earliest town in Montana, Stevensville.

Several major historical and cultural sites occurred or occur on or within 5 miles of the refuge: Salish camps, Lewis and Clark National Historic Trail, St. Mary's Mission, Fort Owen, Whaley Homestead, and Nez Perce National Historic Trail. The buildings of St. Mary's Mission, Fort Owen, and the Whaley Homestead are all on the National Registry for Historic Places. Additional signage and interpretation programs would need to be developed to interpret these sites.

Very little interpretation of the Whaley Homestead has been completed because of its current condition. The structure is not safe enough to allow visitors to regularly walk through the building, despite the resources and time the refuge and other partners have dedicated to maintaining it. A National Register of Historic Places sign does provide some history of the site. The interior has been updated by the occupants over the years but does not match the period of the late 1800s. To properly interpret this site while protecting the structure and visitors, the refuge would need to determine what level of interpretation is appropriate and then work with partners to restore and interpret this historical homestead based on these guidelines. To date many refuge partners have expressed enthusiasm and willingness to help restore the site (in part by providing period furniture). Such efforts could ultimately allow visitors to enter this home and interpret the history of early settlers. Nevertheless, these efforts would be costly, and the Service must ensure that this historical structure remains protected.

The overarching interpretive theme for the Whaley House would be land use and its effects on wildlife. Topics would include hydrological changes, agricultural practices, grassland conversion, lumber and forest ecology, and native plant usage, all of which have and would continue to affect refuge resources.

## 5.8 Goal for Visitor Services

Provide visitors of all abilities with opportunities to participate in and enjoy quality, compatible wildlife-dependent recreation, environmental education, and interpretation programs that foster an awareness and appreciation of the importance of protecting

the natural and cultural resources of the refuge, the Bitterroot Valley, and the National Wildlife Refuge System.

### HUNTING OBJECTIVE

Continue to provide and improve the quality of waterfowl and deer hunting opportunities, facilities, and access points to provide for the safety and enjoyment of refuge hunters of all abilities and work with the State to determine if additional opportunities for hunting white-tailed deer hunting opportunities could be provided.

#### Strategies

- Continue to provide a quality white-tailed deer (archery only) hunt on designated lands according to State regulations. Continue to provide a quality waterfowl hunt from designated blinds on the southeast part of the refuge, according to State regulations.
- Work with the State to determine the viability of allowing hunters to use muzzleloaders and shotguns to harvest white-tailed deer (depending on the deer population) within this archery-only hunting district (currently Hunting District 260). Consider rotating the areas where firearms are permitted depending on management objectives. Limit the number of hunters permitted to use firearms.
- Continue to work with local hunters to rebuild, prepare, and maintain waterfowl hunting blinds. Upgrade the current blinds that are available to hunters with disabilities.
- Allow archery hunters with disabilities to access refuge roads near the Whitetail Golf Course (within the refuge boundary).
- Produce a large print version of the hunting and fishing brochure.
- Provide an annual "tear sheet" outlining the specific refuge regulations for all hunting programs.
- Post a sign at the beginning of the Kenai Nature Trail to make trail users aware of their potential proximity to archery hunters.
- Provide spent-shell deposit sites near hunting areas.
- Continue to monitor hunter satisfaction and harvest information.
- Manage submergent aquatic and upland vegetation within waterfowl hunt areas to improve the hunt quality.
- Enforce waterfowl hunt regulations, including shoot times and access.
- Continue to collaborate with the State to provide hunter education programs to youth.
- Provide a limited number of waterfowl decoys for checkout from the refuge headquarters.

## Rationale

White-tailed deer and waterfowl hunting were permitted soon after the refuge was established. Today, hunting is one of the most popular compatible wildlife-dependent activities offered on the refuge. As practiced on Lee Metcalf Refuge, hunting does not pose a threat to the wildlife populations, and in some instances it is necessary for sound wildlife management. The refuge works with the State to carefully regulate its hunting program and maintain equilibrium between population levels and wildlife habitat.

On the refuge there is a lack of regeneration of native trees and shrubs, which are important components for migratory bird habitat. White-tailed deer browse heavily and may be the cause of this lack of regeneration and plant diversity. Although the refuge is open to hunting, it lies within Hunting District 260, an archery-only hunting area. Archery hunting does remove some of these deer; however, the challenges associated with this type of hunting (for example, animals must be in close range) affect the success rate of hunters. Adding a limited firearm season, during which shotguns and muzzleloaders could be used, would provide opportunities for non-archery hunters; it may also improve harvest rates and better disperse the deer during the long archery season (currently over 4 months). The refuge would work with the State and collect data on white-tailed deer numbers to help determine the need for expanding this hunting opportunity.

The refuge maintains 15 designated waterfowl hunting blinds, two of which are reserved for hunters with disabilities. The labor and cost associated with maintaining the blinds would continue to be offset by volunteer assistance, particularly from waterfowl hunters.

## FISHING OBJECTIVE 1

Following State and Federal regulations, continue to provide opportunities for anglers of all abilities to fish within the WVA, including the associated banks of the Bitterroot River and Francois Slough.

### Strategies

- Continue to permit fishing on Francois Slough after the riparian habitat is restored.
- Maintain the accessible fishing (and wildlife observation) platform in the WVA.
- Prohibit boats anywhere on the refuge (except the Bitterroot River). No boats can be launched on the refuge.
- Prohibit boaters from accessing the refuge from the Bitterroot River.
- Continue to provide updated fishing regulations in a combined hunting and fishing brochure, following Service graphic standards.

- Restore instream and riparian habitat on North Burnt Fork Creek to improve the quality of the creek's cold-water fishery.

## Rationale

Compatible and accessible recreational fishing opportunities are available at Francois Slough and the Bitterroot River, both within the designated WVA. The remainder of the refuge is closed to fishing, except for special events.

Most anglers come to the refuge not only to fish but also to appreciate the wildlife and beautiful scenery of the Bitterroot Valley. Fishing, like hunting, can serve as the foundation for an individual's appreciation of conservation efforts and environmental ethics. Once people begin to appreciate and care about the wildlife they enjoy and experience firsthand, they take this appreciation and awareness back to their own communities and backyards.

Currently some anglers use the fishing platform to access Francois Slough and its largely nonnative fishery. The restoration proposed for Francois Slough (associated with North Burnt Fork Creek) would restore a natural stream that could improve the quality of the habitat for native fish. The existing accessible fishing platform could still be used by anglers to access this restored stream.

Thousands of anglers and boaters float the Bitterroot River. In many areas, the refuge property includes the entire existing channel of the Bitterroot River along with the uplands west of the river. Recent land surveys indicate that lands through and west of the Bitterroot River are part of the refuge. The refuge would seek to open the areas west of the river for public uses, including fishing.

## FISHING OBJECTIVE 2

Provide an opportunity for children of all abilities to learn about the techniques and enjoyment of catching fish.

### Strategies

- Work with partners to host an annual accessible fishing event and others, if possible. Consider holding these events within areas closed to public fishing (to increase fishing success) if they do not violate the policy requirements of appropriate use and compatibility or inhibit restoration efforts.
- As part of the environmental education program, provide students at these events with educational materials on the impacts of nonnative fish—particularly largemouth bass, which dominates many refuge impoundments.
- As appropriate, provide an opportunity for MFWP to transfer captured largemouth bass to existing State closed-basin, warm-water fisheries.

- At events, deliver presentations on the refuge, its purposes and resources, and the values of the Refuge System.

### **Rationale**

The Service's wildlife recreation policy promotes the enjoyment and techniques of fishing, particularly among children and their families. The refuge has an opportunity to work with partners, including the State, to provide opportunities for students to learn about the enjoyment and proper methods and ethics for catching fish while fostering a desire to continue fishing on refuges and other State waters. This initiative has an even broader purpose of teaching children about the outdoors so they may be able to appreciate it.

The greatest opportunities to catch fish on the refuge—particularly largemouth bass—are in Ponds 8 and 10. These ponds are closed to all other public fishing, so allowing any public events requires a compatibility determination (appendix D). Also, since largemouth bass are not native to this area, students would be provided information on the impacts of nonnative fish on native species and their habitats. The State would assist with this education and may be permitted to transfer these captured nonnative fish to other State warm-water fisheries. These State waters already contain populations of largemouth bass. The State uses these closed basin nonnative fisheries to take pressure off more sensitive fishing areas that may contain threatened cold-water species, such as bull trout.

### **WILDLIFE OBSERVATION AND PHOTOGRAPHY OBJECTIVE**

Without impeding the migration of the Bitterroot River, maintain and create additional facilities and programs for wildlife observation and photography for visitors of all abilities. These additional opportunities would provide visitors with a new and exciting perspective that would enhance the visitor's appreciation and connection to the wildlife and the habitats of the refuge and the Bitterroot Valley.

#### **Strategies for Wildlife Observation**

- Continue to maintain and manage the WVA; however, do not add artificial structures to protect the WVA's trails and structures from the movements of the Bitterroot River. Relocate threatened facilities and eroded trails to other areas, as appropriate.
- Continue to maintain all walking trails not impacted by river movements, and one viewing and fishing platform and associated facilities, keeping two of these trails and the viewing platform accessible to visitors with disabilities (figure 6).
- Improve the WVA entrance for wheelchair use, replacing the gate with bollards that allow wheelchairs to pass between.

- Continue to provide spotting scopes, binoculars, and bird books for wildlife observers at the expanded visitor center.
- Add signage to ensure that visitors remain on designated trails.
- As appropriate, relocate portions of the Kenai Nature Trail to the adjacent upper road to provide a more level walking surface and to reduce disturbance to waterfowl and other waterbirds using the wetlands below the trail. Upgrade the road to this trail. Maintain the closed area immediately east of this trail.
- Add a seasonal walking trail around Pond 8 (figure 6). This trail would be opened seasonally, as appropriate, to protect waterfowl and other waterbirds using this pond.
- Replace the stationary spotting scopes located along existing trails and add an additional spotting scope within the WVA.
- Treat invasive species along designated trails.
- Add interpretation to new and existing trails, including information on the wildlife species that visitors may encounter.
- Work with the county to develop Wildfowl Lane—the county road that travels through the refuge—as an auto tour route with pulloffs and accompanying interpretation.
- Update and reprint the refuge's current wildlife species list, including a large print version that meets the Service's graphic standards.
- Add recommendations for wildlife viewing etiquette to the general brochure and wildlife list.
- Consider installing a remote camera on a nest area; this image could be streamed not only in the visitor contact area but also on the refuge's Web site.
- Provide wildlife observation information through the internet via the refuge's homepage, blog, and social media sites.

#### **Strategies for Photography**

- Continue to maintain two stationary photography blinds.
- Require a special use permit (approved by the refuge manager) for commercial photography proposals that benefit the refuge and provide the photographer access or privileges not afforded to the general public. Commercial photography proposals not benefitting the refuge or Refuge System would not be allowed.
- Require a special use permit (approved by the refuge manager) for commercial filming.
- All permitted commercial photography and film would be made available for Service use (excluding

that which is provided to other parties for commercial uses).

- Through partnerships, work with photographers to build the refuge's photo library.
- Make two portable photo blinds available for use in areas currently open to the public.
- Through partnerships, conduct an annual wildlife photography workshop highlighting how to photograph wildlife while causing minimal disturbance.
- Upgrade waterfowl hunting Blind 2 to provide a photo blind for photographers with disabilities.
- Work with photography schools to build the refuge's photo library and assist with the annual photography workshops while providing wildlife photography opportunities to their students.

### Rationale

Most visitors to the refuge come to view and photograph wildlife and the beautiful scenery of the Bitterroot Valley. Wildlife observation has been found compatible on the refuge. Wildlife observation often serves as the foundation for an individual's environmental ethics. Once people begin to appreciate and care about the wildlife they enjoy and experience firsthand, they take this appreciation and awareness back to their own communities and backyards.

Currently most visitors view wildlife from Wildfowl Lane, a county road that travels through the refuge. However, this is not an official tour route and offers no interpretation. Working with the county to turn Wildfowl Lane into an auto tour route, if appropriate, may take some effort, particularly for any improvements such as pulloffs and accompanying interpretation.

The proposed trail around Pond 8 would be 1.25 miles in length and provide visitors with another opportunity to independently explore the refuge and view wildlife. This trail would extend the Kenai Nature Trail westward using the Pond 8 dike road (near Potato Cellar Pond); it would then loop south, travel just north of a former residence site, and then connect to Wildfowl Lane (figure 6). This trail would be located close to an existing heron rookery and waterfowl migration areas. To protect these species, the trail would be closed seasonally. These and other proposed improvements to the photography and wildlife viewing areas within the refuge would enhance the visitors' experiences, provide better opportunities for viewing and photographing wildlife, and help foster their connection to the area's unique habitat and wildlife. This connection may result in a greater understanding and appreciation of the refuge and its resources including the wildlife species found within the Bitterroot River Valley. By working with partners, including commercial photographers, the refuge would continue to build a photo library that could be used in publications and education and outreach tools, including interpretive

displays and the refuge's Web site. There is almost always some disturbance to wildlife in areas open to the public, particularly when visitors approach too closely or don't follow refuge regulations (for example, by traveling off designated trails or removing vegetation for a photo). To reduce these impacts, visitors would be provided refuge-specific materials (brochures, podcasts, and education programs) to facilitate wildlife friendly behaviors that minimize disturbance. This would not only reduce the impacts on refuge wildlife and their habitats but improve the overall quality of opportunities for all visitors.

### ENVIRONMENTAL EDUCATION OBJECTIVE

Continue and expand environmental education programs and activities on and off the refuge for at least 1,500 adults and 4,000 students of all abilities. These programs would focus on the values and importance of the natural, historical, and cultural resources of the refuge and the Bitterroot Valley, including the refuge's efforts to maintain, enhance, and restore native plant and wildlife communities on the refuge.

### Strategies

- Recruit a visitor services specialist to and develop and present programs.
- Develop programs and materials that could be used year-round and encourage teachers and students to explore the refuge beyond the popular spring season.
- Through partnerships, continue to organize and provide at least 15 on- and off-refuge annual and special events for adults and students.
- Conduct teacher workshops annually to better orient and equip teachers to independently explore and learn about the refuge resources.
- Establish and widely publicize field trip planning procedures for teachers.
- Use current and new education kits to provide at least five offsite school presentations annually.



Bob Dantley/USFWS

*The refuge's amphitheater is a good venue for environmental education and visitor services events.*

- Continue to allow teachers and students to independently explore the refuge's public use areas, determining if any participants require special assistance due physical limitations. Provide an orientation on where and how to best explore the refuge, and provide teachers with background information prior to their arrival.
- Develop exploration backpacks that can be checked out and used by students; these backpacks would include suggested projects, species they would see, along with some field supplies such as invertebrate sampling nets, water testing kits, and binoculars.
- Working with local teachers, continue to maintain, develop, and provide multimedia educational kits related to refuge resources and make them available to local teachers and students for use in onsite visits or in their classrooms.
- Develop an education program that focuses on climate change in the Bitterroot Valley.
- Work with local teachers to develop a refuge-specific curriculum that meets State standards.
- Develop an education kit that explains the history and value of the restoration efforts proposed under this alternative.
- Continue to serve as the coordinator for the State Junior Duck Stamp Program.
- Expand opportunities to collaborate with universities to provide outdoor classrooms for students wanting to learn about the refuge, its management programs, its current issues, and the values of the Refuge System.
- Develop a partnership with local universities to provide opportunities for students to conduct research and monitoring projects that are beneficial to the refuge, and provide an opportunity for students work with refuge staff.
- Add a classroom and associated supplies to the expanded visitor center for environmental education programs.
- Organize or participate in five additional annual environmental education events on and off the refuge.
- Pursue partnerships and grants to acquire additional resources for environmental education programs.
- Expand the refuge's online presence (social media, blog, Web site) to include interactive educational opportunities and help teachers plan field visits.
- Provide training opportunities for added staff and volunteers to improve their capabilities and knowledge in developing and presenting environmental education programs.
- Meeting Service graphic standards, use both the refuge's Web site and a tearsheet to list all the educational resources available through the refuge



Bob Danley/USFWS

*Under the proposed alternative, the refuge would continue to coordinate the State Junior Duck Stamp Program.*

and the Service, and make this available to schools and other interested groups.

- Continue to collaborate with the State to provide hunter education training.
- Provide assistance to students interested in completing school science projects related to the natural resources found on the refuge, including mentoring and project development.
- Collaborate with the State, universities, the Salish Tribe, and other entities to create focused activities (environmental education and other visitor uses) for environmental education and visitor service programming, including special events.
- Participate in events sponsored by the Confederated Salish and Kootenai Tribe, including the River Honoring event for students. Provide information on refuge resources and the Bitterroot River Valley, where the Salish Tribe had lived for centuries.

### Rationale

Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges; develops the necessary skills and expertise to address the challenges; and fosters attitudes, motivation, and commitments to make informed decisions and take responsible action (United Nations Educational, Scientific and Cultural Organization 1978). Through environmental education, the Service can help develop a citizenry with the awareness, knowledge, attitudes, skills, and drive to work cooperatively toward the conservation of environmental resources. Environmental education within the Refuge System incorporates onsite, offsite, and distance-learning materials, activities, programs, and products. These educational tools describe the refuge's purposes, physical attributes, ecosystem dynamics, and conservation strategies as well as the Refuge System mission. They also provide some history and perspective on this area prior to Euro-American settlement,

including the native vegetation, natural waterways, and the unique culture and importance of this area to Native American people.

Since today's children are tomorrow's land stewards, it is essential to help them become aware of the natural world and how they can protect and restore it. Today, most students learn about their natural world online, through books, or highly structured programs. These methods do provide educational benefits, but it is also effective simply to allow students to explore on their own. Refuge programs must not be so rigid that children cannot learn by using their own imaginations and senses.

Environmental education is one of six wildlife-dependent recreational uses identified in the Improvement Act as a priority public use for the Refuge System, and it has been emphasized and supported on Lee Metcalf Refuge for many years. Given the refuge's proximity to some of the more urban areas in Montana, including Missoula, there is a tremendous opportunity to do even more, including promoting the refuge as a conservation learning center where adults and children can learn about refuge resources, the unique history and importance of the Bitterroot Valley, and the values of the Refuge System. The refuge has focused most of its efforts on schools and groups that travel to the refuge, but with additional staff, greater opportunities would exist to travel offsite and reach a broader audience.

Providing teacher workshops and materials for independently exploring the refuge would make even more teachers and students feel welcome while learning why the refuge is here, how it benefits them, and why it should be protected for future generations to enjoy and appreciate.

## INTERPRETATION OBJECTIVE

Improve, maintain, and create additional interpretive opportunities for the public that focus on refuge purposes; the natural, cultural, and historical resources of the refuge and Bitterroot Valley; and management programs and challenges, including future habitat restoration projects. These enhanced facilities and universally accessible programs would encourage visitors to independently explore and learn more about not only the values of this refuge, but also about how they can be part of protecting and restoring native and productive habitats to this refuge, the Bitterroot Valley, and other lands within the Refuge System.

## Strategies

- Recruit a full-time permanent General Schedule (GS)-7 (could be upgraded to 9) visitor services specialist to work with volunteers, manage the visitor center, and develop and present programs.
- Identify interpretive themes for the refuge and use them to develop professionally planned and produced interpretive panels and brochures; these

themes would be used in future interpretive programs to consistently highlight the most important and unique aspects of the refuge, its history and purposes, current management and challenges, and proposed habitat restoration projects.

- Develop a theme and message for the visitor center that focuses on floodplain restoration, wetland impoundment management, native wildlife, migratory birds, the refuge's cultural and natural resources, and the role of the Refuge System.
- Update interpretive panels to provide a variety of information including rules and regulations, the natural and cultural resources of the refuge and the Bitterroot Valley, habitat restoration projects, and the value of the Refuge System. Design panels to have a consistent appearance and to allow refuge staff to easily update them with dynamic and timely information.
- Continue to maintain and update the current five kiosks, including three with interpretive panels. Locate an additional interpretive panel along the river trail within the WVA that explains the migration of the Bitterroot River.
- Ensure that all current and future refuge brochures meet Service graphic standards and provide up-to-date information that is useful for interpretive programs and better orients visitors.
- Train volunteers to provide interpretive programs on the natural, historical, and cultural resources of the refuge and the Bitterroot Valley.
- Make online resources (podcasts, Web site, blog, social media) available that interpret refuge resources along the public roads and trails.
- Restore native habitat around entrance areas and kiosks and provide identification and interpretation of this native vegetation.
- Provide interpretation along the Kenai Nature Trail, within the WVA, and along the auto tour route.
- Participate in events highlighting the history of the Lewis and Clark expedition in the Bitterroot Valley.
- Through partnerships, develop a new refuge video highlighting the history and resources of the refuge.
- Construct a kiosk at the parking lot on the north end of the refuge, used by refuge hunters, that provides regulations as well as information on refuge purposes and resources.

## Rationale

Interpretation is the identification and communication of important messages about natural and cultural resources to diverse audiences. Interpretation is designed to reveal relationships about the nature, origin, and purpose of a resource, landscape, or site in a way that forges connections between the interests of the audience and meanings inherent in the resource (National

Association for Interpretation 2011). Interpretation is a resource management tool that can be designed to develop understanding, and through understanding comes appreciation, and through appreciation comes protection of our natural resources.

Interpretation is one of six wildlife-dependent recreational uses identified in the Improvement Act as a priority public use for the Refuge System. The refuge already contains some facilities and displays that interpret refuge resources, provide regulations, and orient visitors. The refuge hosts over 143,000 visitors annually and predicts that number would increase over the next 15 years. Tremendous opportunity exists to further educate these and future visitors about the importance of maintaining, restoring, and enjoying the natural and cultural resources of the refuge and the Refuge System.

## **SIGNAGE OBJECTIVE**

Maintain an effective network of signs that meet the Service's standards and notify the public of refuge boundaries, public use areas, and closed areas by annually reposting, replacing, and/or maintaining 20 percent of the refuge signs.

### **Strategies**

- Determine the opportunity to add directional signage along Interstate 90 and improve it along Highway 93.
- Develop an entrance sign on or near the environmental education shelter in the WVA to notify river floaters that they are entering the refuge.
- Add and maintain more consistent boundary signage—particularly along the west side of the refuge (and the river)—so the public is aware that they are entering the refuge.
- Ensure that electronic directional devices, Web sites, and other printed materials correctly identify the location and information for refuge.
- Ensure that signage has a similar appearance, meets Service graphic standards, and provides a consistent message or theme.
- Mark the west boundary of the refuge with signage and open or maintain closure for public use.
- Post a sign at the beginning of the Kenai Nature Trail to make visitors aware of appropriate uses of the trail and their potential proximity to archery hunters.
- Establish the refuge's primary point of entry as the east entrance, which would be closest to the expanded visitor center; a directional sign at the refuge boundary would include the distance to the visitor center and WVA.
- Develop an entrance sign for the northeast corner of the refuge within easy view of the East Side Highway.
- Place a directional sign at the east and south entrances identifying the distance to the visitor center.
- In areas open to public use, such as the WVA, exchange "unauthorized entry" signs for "refuge boundary" signs.
- Develop new panels for the two entrance kiosks including an orientation panel with regulations, a Refuge System panel, and a system for displaying changing information including current events.
- Develop new panels for the kiosk in the WVA to include an orientation panel, a panel with a map and information about this part of the refuge, and a system for displaying changing information.
- Develop a 2-foot by 3-foot orientation panel at refuge headquarters to provide information for after-hours visitors.
- Move the single-paneled kiosk from behind the visitor center out to the front of the building for after-hours visitors.
- Develop a sign that guides visitors to the WVA from the visitor center, and provide a directional sign to the visitor center at the road where the Whitetail Golf Course begins.
- Work with the community of Stevensville to install interpretative and regulation signage at the Bitterroot River boat launch.
- Add a Service logo to the side of the headquarters building that faces the parking area.
- Update publications to show the same hours of operation that are posted at the visitor center.
- Post the law enforcement officer's phone number at kiosks and instruct visitors to call 911 for emergencies.

### **Rationale**

Overall, the refuge boundaries are well signed, and directional signage orients visitors. However, opportunities exist to improve boundary, directional, and informational signage for the refuge's 143,000 visitors. Maintaining and replacing these signs is time-consuming but critical for orienting visitors, welcoming visitors, protecting refuge habitats, and preventing trespass. The refuge is surrounded by private, State, and some USDA Forest Service land. There are issues with trespassing that could be resolved with additional boundary signage and outreach. Most trespass occurs on the western boundary, particularly by boaters who leave their boats, unaware that they are entering the refuge.

## 5.9 Goal for Partnerships

Maintain and cultivate partnerships that help achieve the vision and supporting goals and objectives of the Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan and support other initiatives designed to protect and restore habitats for Federal trust species within the Bitterroot River Valley.

### PARTNERSHIP OBJECTIVE

Foster a strong and effective working relationship with existing partners and new partners for the purpose of protecting cultural and historical resources, developing and providing visitor services programs, and managing and restoring the refuge's habitats for target species. The refuge may participate in other partnerships that support refuge and Service initiatives including providing additional habitat for Federal trust species within the Bitterroot River Valley.

### Strategies

- Continue to work with conservation organizations, communities, schools, State and Federal agencies, and tribes to collaborate on projects of mutual interest.
- Work with partners to restore the connectivity of North Burnt Fork Creek for native fish species and riparian habitat.
- Continue to participate in the interagency weed group to address invasive and nonnative species on and near the refuge.
- Expand efforts to recruit and support volunteers for the refuge's visitor services and biological programs.
- Continue to work with partners to restore and preserve the Whaley Homestead.
- Work with universities to incorporate various disciplines into refuge programs to address issues concerning visitor services and refuge resources.
- Continue to participate in valley-wide efforts to protect habitat and wildlife corridors on private lands surrounding the refuge.
- Work with the Whitetail Golf Course, located within the refuge boundary, to address wildlife habitat and impacts on adjoining refuge lands and waters.

### Rationale

Partnerships are vital to achieving the Service's mission, including the vision for Lee Metcalf Refuge. Many of the refuge's wildlife, habitat, and public use programs and habitat projects could not continue without the funding and support from refuge partners, including volunteers.

The Service must emphasize working cooperatively with others; develop a more integrated approach to problem-solving and share resources to get the job done; and make choices and find efficiencies in both resource and business management practices. This focus reinvigorates the refuge's current intergovernmental coordination efforts. Numerous Federal, State, tribal, and local agencies and private citizens could be considered partners for the refuge. However, more could be done to inform and educate the partners about the refuge's value and goals. In the same vein, the Service is willing to help other agencies with issues, such as invasive plant control and specific wildlife conservation issues. Much of this coordination could be accomplished through regular meetings and by developing personal relationships with individuals within other agencies and surrounding communities.

## 5.10 Goal for Operations and Facilities

Prioritize wildlife first and emphasize the protection of trust resources in the utilization of staff, volunteers, funding, and facilities.

### STAFF OBJECTIVE

Recruit additional staff and volunteers needed to fully carry out the proposed actions in this draft CCP, including actions concerning public use, habitat management, inventory and monitoring, and research.

### Strategies

- Retain the current permanent, full-time refuge positions: refuge manager, outdoor recreation planner, law enforcement officer, administrative assistant, and maintenance worker.
- Continue to provide office space and support for zone and state-wide support staff, including a fire management officer, range (fire) technician, business team staff member, regional maintenance team member, and IPM strike team leader and team.
- Recruit a GS-7 (could upgrade to 9) visitor services specialist to manage the visitor center, develop and conduct programs, and recruit and supervise volunteer staff.
- Recruit a GS-9 (could upgrade to 11) deputy refuge manager.
- Recruit a GS-5 (could upgrade to 7) biological science technician.
- Recruit one GS-5 career seasonal biological science technician.

- Continue to work with Montana universities to develop a volunteer program by providing college credits in exchange for volunteer work experience.
- Actively recruit additional volunteers to assist with expanded visitor services programs and habitat management and restoration projects.

### Rationale

Lee Metcalf Refuge supports several other State and regional Service programs, including fire, regional maintenance team, business team, and invasive species programs. Although 14 full-time and seasonal Service employees are stationed at Lee Metcalf, only five are specifically assigned to conduct refuge programs. The State and regional resource employees do provide some support for the refuge's maintenance and habitat projects, but their regional duties take precedence.

To accomplish the proposed goals and objectives described in this draft CCP, additional staff, partnerships, and volunteers would be needed. One of the most significant needs is in the refuge's visitor services program. Currently the refuge has over 143,000 visitors annually. The refuge has one outdoor recreation planner who is able to provide onsite programs, but there is a tremendous opportunity to do more outreach, interpretation, and education with students and adults, both on- and off-refuge. The vision for the refuge is to serve as an ambassador for not only the refuge but also the Refuge System. To accomplish this goal, additional staff would be needed to develop and provide programs, work with local schools and communities, and develop partnerships that could expand the refuge's capabilities and outreach.

Restoring refuge habitats, particularly gallery and riverfront forests only, is possible if the refuge can complete much of the restoration and subsequent monitoring using Service equipment and staff including (1) monitoring the response of target species; (2) planting and maintaining restoration sites; (3) monitoring the spread of invasive plants; (4) removing levees, ditches, and other structures; and (5) working with other partners, including volunteers, universities, State and Federal agencies, and conservation organizations

interested in studying and assisting with this restoration. At a minimum, a biological science technician, under the direction of refuge management, would be required to conduct much of this monitoring, along with partners, such as universities.

Current staff at the refuge consists of five permanent full-time employees including a refuge manager, outdoor recreation planner, law enforcement officer, maintenance worker, and an administrative assistant. There are also five zone and regional Service employees who are based out of this office, but they are not assigned to exclusively support refuge programs. Table 12 shows the current staff and proposed additional staff required to fully implement the CCP. If all requested projects and positions were funded, the refuge would be able to carry out all aspects of this CCP, which would provide the most benefit to wildlife, improve facilities, and significantly enhance public use programs. In the interim, projects that have adequate funding and staffing would receive priority for accomplishment. Staffing is requested for the 15-year life of this CCP.

### FACILITIES, EQUIPMENT, AND SUPPLIES OBJECTIVE

Maintain and acquire the facilities, equipment, and supplies needed to support all current and proposed biological, visitor services, and maintenance programs proposed in this draft CCP including support for added staff.

#### Strategies

- Expand the current visitor contact area into a visitor center including added space for professionally planned and produced displays, office space, a restroom available during closed hours, and a combined environmental education classroom and conference room.
- Relocate the pole barn closer to the maintenance area.
- Purchase or build a seed storage bin for storing native seed.
- Construct a duplex to provide housing for seasonal, transitional, and detailed staff.

**Table 12. Current and proposed staff for Lee Metcalf National Wildlife Refuge, Montana.**

<i>Program</i>	<i>Current positions</i>	<i>Proposed additional staff</i>
Management	GS-485-12 refuge manager	GS-485-9 (could upgrade to 11) deputy refuge manager
Biology	None	GS-404-5 (could upgrade to 7) biological science technician GS-404-5 career seasonal biological science technician
Administration	GS-0303-7	None
Law enforcement	GS-0025-7 (could upgrade to 9)	None
Maintenance	WG-4749-08 maintenance worker	None
Visitor services	GS-025-11 outdoor recreation planner	GS-025-7 (could upgrade to 9) visitor services specialist

*Abbreviations: GS = General Schedule, WG = Wage Grade.*



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*The refuge's existing headquarters would be expanded to include additional office space and a combined classroom and conference room.*

- Through partnerships, rehabilitate and maintain the historical Whaley Homestead.
- Incorporate green technology and power sources into all new construction and rehabilitation.
- Purchase an excavator to complete proposed restoration projects.
- Recruit an additional Wage Grade (WG)–6 maintenance worker to maintain current and proposed refuge facilities.
- Add a wash bay and containment area for washing equipment and vehicles to reduce the spread of invasive species.

### Rationale

A large portion of refuge facilities, equipment, and supplies are adequate to support the current refuge operations; however, most facilities are fully utilized and some are in need of modifications to support even current programs, particularly the public use facilities. The refuge hosts over 143,000 visitors annually. Currently, most visitors are greeted in the small visitor contact area, which is inadequate for supporting refuge visitors and for housing an effective interpretive program. Expanding this area to include a combined environmental education classroom and conference room would allow the refuge to develop more effective and dynamic interpretation and education programs for adults and children. This expansion would also include additional offices for proposed added staff.

The bunkhouse remains full throughout the field season, supporting refuge and regional programs based out of the refuge. Additional seasonal and transitional staff housing is needed. Availability of this housing would be critical to recruitment of seasonal staff, because rental housing is very limited and costly in the surrounding rural communities. This would be even more critical if the refuge does not receive support for permanent staff, as more seasonal employees would be required.

Recruiting an additional maintenance worker would not only ensure the current and future facilities and equipment are maintained, but it would provide the support needed to complete the extensive proposed restoration projects, including a significant amount of dirtwork and planting of native seed and plants. Acquiring the necessary equipment and supplies to support these restoration and maintenance programs would also be essential to completing and maintaining the projects described in this proposed action.

Refuge vehicles and equipment can be a source of transport for seeds and plant materials from invasive species. This can allow these plants to spread into other areas of the refuge. Installing a wash station where each piece of equipment could be cleaned after use in the field or before being transported to other areas could help prevent some of this spread.

## 5.11 Stepdown Management Plans

The CCP is a broad umbrella plan that provides general concepts and specific objectives for habitat, wildlife, public use, cultural resources, partnerships, and operations over the next 15 years. The purpose of the stepdown management plans is to provide details to Service staff for carrying out specific actions and strategies authorized by the CCP. Table 13 lists the stepdown plans needed for the refuge, status, and next revision date.

## 5.12 Research, Monitoring, and Evaluation

Appendix D contains the draft compatibility determination for research that supports refuge objectives and programs. Furthermore, the Service proposes to most efficiently deal with the uncertainty surrounding restoration and habitat management with adaptive resource management (figure 25; Kendall 2001, Lancia et al. 1996, Walters and Holling 1990). This approach provides a framework within which objective decisions can be made and the uncertainty surrounding those decisions reduced at the time that they are made. The key components of an adaptive resource management plan, such as this draft CCP and proposed stepdown plans, follow:

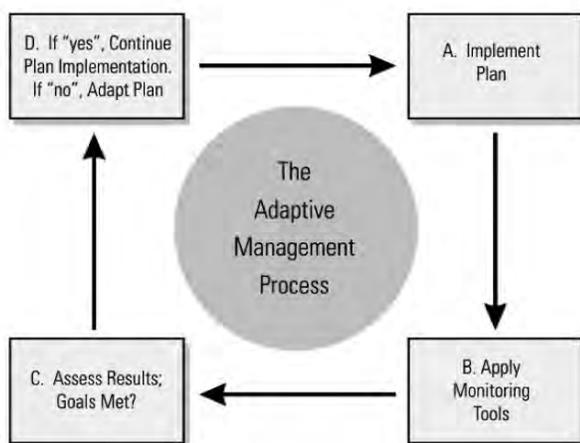
- clearly defined management goals and objectives
- a set of management actions with associated uncertainty as to their outcomes

**Table 13. Stepdown management plans for Lee Metcalf National Wildlife Refuge, Montana.**

<i>Plan</i>	<i>Completed plan (year approved)</i>	<i>New or revised plan (completion year)</i>
Disease contingency plan	—	2015
Chronic wasting disease	2005	2015
Avian influenza	2006	2015
Fire management	2011	Revised when HMP is completed
Habitat management plan	—	2014
Inventory and monitoring plan	—	2014
Integrated pest management	—	2015
Wildlife inventory	1991	2018
Refuge safety	—	2013
Occupant emergency	1995	2014
Spill prevention	—	2013
Water management	2002	2014
Visitor services	—	2016

- a suite of models representing various alternative working hypotheses describing the response of species or communities of interest
- monitoring and assessment of the response of target organisms
- use of monitoring and assessment information to direct future decision-making through the selection of a best model

The first three components—goals, actions, and models—are largely defined before initiation of an adaptive resource management plan. The latter two components, monitoring and directed decision-making, compose a repetitive process whereby each year the

**Figure 25. Adaptive management process.**

predictive ability of models is tested against what was observed during monitoring. This may result in a new best model, greater support for the existing best model, or new models constructed from emerging hypotheses. In this way, management can evolve as more information about the refuge is gained and uncertainty is reduced.

Development of adaptive resource management plans for habitat management would allow refuge staff to “learn by doing” and adapt to a changing climate while focusing on management objectives. Knowledge gained from assessing management actions is as integral to the process as the management actions themselves. This emphasis on gaining knowledge about the refuge creates a situation whereby the staff can refine its habitat management with feedback between management and assessment.

## 5.13 Plan Amendment and Revision

The Service would annually review the final CCP to determine the need for revision. A revision would occur if and when significant information became available such as a change in ecological conditions. Revisions to the CCP and the stepdown management plans would be subject to public review and compliance with NEPA. At a minimum, the Service would evaluate the plan every 5 years and revise it after 15 years.

