



Chapter 2 Management Direction

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2.1 Overview

The established refuge purposes serve as the foundation on which this plan is constructed (see Chapter 1). Formulating management direction that corresponds with refuge establishment purposes is mandated for National Wildlife Refuges by the NWRS Administration Act of 1966 (as amended [16 U.S.C. 668dd-668ee](#)). Malheur Refuge’s purposes and natural resource considerations are therefore foundational in formulating the management direction of this CCP. [House Report 105-106](#) accompanying the [National Wildlife Refuge System Improvement Act of 1997](#) states, “the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first.”

This CCP was also developed through a collaborative process in order to solicit and incorporate public input throughout all stages of plan development, as well as build support for its content and implementation. A variety of organizations and individuals contributed to this CCP (see Appendices I and J). Together with vested collaborators and stakeholders, we created, reviewed, and refined the content of the management direction for the Wildlife and Habitat, Visitor Services, Cultural Resource, and Paleontology programs through a series of interactive meetings.

Each collaborative meeting was attended by 30 to 40 participants, including technical experts, scientists, government agencies, conservation organizations, local and statewide residents, recreation groups, Tribal representatives, refuge visitors, and elected officials. Technical working groups were created by the Service to serve as forums for specific complex resource issues.

Of the resource concerns discussed by participants these significant issues were identified as priorities: improvement of aquatic health through carp population control; enhancement of the inventory and monitoring program (including climate change); habitat management (including implementation and adaptive management); active engagement with partners to implement and evaluate management and restoration activities within and beyond our refuge boundaries; and strategic assessment and planning for the restoration of refuge watersheds, primarily the Blitzen River and its tributaries.

The poor aquatic health of the Refuge’s lakes and wetlands is the biggest and most immediate issue facing the Refuge over the next 15 years. Common carp are the largest contributor to degradation of aquatic habitats. With carp as the top priority, staff time and funding will be predominantly directed at reducing the carp population to a threshold goal of 100 pounds of carp per acre in refuge lakes (see Appendix R). Studies (Bajer et al. 2009) have shown that at this level, carp impacts to the food web are reduced and other organisms can flourish despite the presence of carp. Carp control strategies must also address minimizing carp numbers in wetland and riverine habitats throughout the Harney Basin. To reach this goal the Refuge will need active partners to assist with assessment and control projects. The Aquatic Health Coalition has been created to leverage partners and secure funding. Three aquatic health working groups have been formed within the coalition to develop strategies for carp population assessment, carp control on- and off-refuge, and partnership enhancement and funding opportunities. Participants consist of fish and wildlife biologists, researchers, subject matter experts, and ecologists from various Federal and State agencies, nongovernmental organizations, and institutions. The desired condition for refuge aquatic habitats would be represented by teeming masses of phytoplankton and zooplankton, reduced suspended silts, and a flourishing diversity of macroinvertebrates, vegetation, and fish—all for the benefit of migratory birds and resident wildlife.

A comprehensive inventory and monitoring (I&M) program is critical to the mission of the Refuge, and the development of an effective I&M program has been identified as an integral part the CCP. This program will allow the Refuge to gather the necessary data to evaluate the impacts of various management strategies, climate change, and other major influences as they relate to CCP goals and objectives. To carry out the I&M program the Refuge will not only need its staff, but others, such as citizen scientists, partners, and other interested parties, to assist with data collection, input, and analysis. We aim to create an I&M program that is transparent, uses best available science, is collaborative, and links to adaptive management strategies.

The Refuge has a diversity of habitats spread across a large landscape interwoven with waterways, both natural and artificial. This complex and interconnected systems of land and water require intensive management. The upland landscape is also overwhelmed with invasive plants (pepperweed (*Lepidium latifolium*) and large monotypic stands of reed canarygrass (*Phalaris arundinacea L.*)) covering thousands of acres. To address this habitat management priority the Refuge established the Ecology Work Group (Appendix L). Consisting of ecologists and wildlife biologists representing a broad assortment of organizations, this group is focusing on the development of habitat models describing successional conditions that will provide guidance in achieving specific plant community objectives. Partners and working groups will continue to work together with the Refuge in the pursuit of the best available science to further our understanding of the effects of implementing management activities, evaluating methods and techniques, and initiating adaptive management to address needed changes. The desired outcome is to work collaboratively with others to address habitat management needs using best available science, innovative methods and techniques, and transparency. The Refuge is committed to keeping our partners, neighbors, and others engaged in our progress and will host an annual educational science day to highlight the methods, techniques, and strategies being used for refuge management.

The restoration of ecosystem function both on- and off-refuge is of great interest to our collaborators. Several watersheds terminate on the Refuge and influence its ecological health. To address these larger landscape issues the Refuge will actively engage with partners to develop and implement solutions. The Blitzen River, for example, was once a free-flowing river that was harnessed while in private ownership to irrigate meadows for livestock. After acquisition of the valley by the Service, water continued to be diverted to meadows and wetlands to provide habitat for migratory birds. Water is fed by gravity from the river into the water delivery system, which consists of approximately 2,000 miles of ditches and canals, and through about 1,000 water control structures. To date millions of dollars have been spent to improve passage and screening at existing facilities and structures for redband trout (*Oncorhynchus mykiss gairdnerii*). The best quality wetland habitat for migratory birds on the Refuge is found within the human-made wetlands and ponds of the Blitzen Valley because the aquatic health of the Refuge's lakes have been so detrimentally impact by invasive carp. Although the Refuge's highest priority is to reach a desired carp control threshold goal of 100 pounds per acre across the entire aquatic landscape, efforts will be made to continue making progress on improving passage and screening to enhance conditions for native fish and to facilitate trapping carp and restricting their movements; on improving water quality and where possible, lowering summer stream temperatures to make riverine conditions more attractive to redband trout and less favorable to carp; and on reducing negative impacts of flood events to nesting birds. The Refuge may pursue small-scale projects that enhance habitat for redband trout and lower water temperatures in the upper Blitzen Valley, which will contribute to the aquatic health objective of a reduced carp population. Watershed restoration is a very complex, multilayered project that will require extensive cultural resource clearances and surveys, water rights evaluation, infrastructure changes, and discussion about desired outcomes. The end result should be substantial improvements

for the Blitzen River and neighboring watersheds, as represented by healthy populations of native fish and mussels, a flourishing diversity of macroinvertebrates and plants, improved passage and screening for redband trout and other native fish, carp passage deterrents, lower water temperature, and reduced turbidity for the benefit of migratory birds and resident wildlife.

2.2 List of Goals

GOAL 1. Enhance aquatic health and habitat conditions essential to the conservation of the flora and fauna that depend on Malheur Lake and associated water bodies.

GOAL 2. Monitor, protect, maintain, and/or rehabilitate riverine and riparian habitats to conditions essential for the conservation of native fish and wildlife species.

GOAL 3. Protect, maintain, and rehabilitate riparian habitats to conditions essential for the conservation of wildlife species.

GOAL 4. Enhance, protect, and/or maintain primary habitats essential to the conservation of a diversity of aquatic and terrestrial wildlife species.

GOAL 5. Enhance and maintain rare and unique habitats.

GOAL 6. Welcome visitors and offer them a safe experience of the Refuge's outstanding features: diversity of wildlife, signs of earlier inhabitants, scenic landscapes, and solitude. As a result, visitors will leave the Refuge with a memorable experience that fosters a connection between themselves and nature, and with an appreciation of its unique natural resources.

GOAL 7. Connect the hearts and minds of visitors with the places and resources the Refuge protects, and enlighten visitors' experiences with an understanding of, appreciation for, and knowledge about the historic and natural resources, and the importance of conservation and stewardship.

GOAL 8. Provide reasonable challenges and opportunities, and provide uncrowded conditions for the hunting and fishing public.

GOAL 9. Initiate and nurture relationships to build support for the Refuge, and fortify refuge programs and activities to achieve the Refuge's mission and goals.

GOAL 10. Manage prehistoric and historic cultural resources for their educational, scientific, and cultural values for the benefit of present and future generations of refuge users and for the communities that are connected to these resources.

GOAL 11. Identify and protect prehistoric and historic resources on the Refuge that are eligible for or listed on the National Register of Historic Places.

GOAL 12. Manage the Refuge's paleontological resources for their educational and scientific values for the benefit of present and future generations of refuge users.

GOAL 13. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

GOAL 14. Integrate our conservation-based mission with the best available science and become a leader in advancing best practices for the design and management of innovative, sustainable refuge and community development opportunities.

2.3 Summary of Management Direction

The management direction described in this CCP can be summarized as follows:

- The primary focus and top priority will be to improve the aquatic health of lakes and wetlands, primarily via aggressive control of common carp.
- Habitat management for specified habitat attributes with wetland habitats¹ will follow. A comprehensive riverine/wetland strategic plan for watersheds within the Refuge will be initiated.
- A more developed and structured visitor experience will be available with additional birding, fishing, and hunting opportunities.
- Historic, cultural, and paleontological resource plans will be developed and protected.

The management direction recognizes that the Refuge is legally mandated to conserve and protect migratory birds to achieve its establishing purposes. Addressing aquatic health is key to meeting this obligation and full attention will be given to its improvement. The greatest obstacle to this effort is common carp, an introduced fish that negatively impacts water quality and in turn impacts native fish, wildlife, and plants that depend on the Refuge's aquatic resources. Primary management emphasis will be placed on improving aquatic health, with staff time and budget largely directed to carp control. Partnerships and staff resources will also address the needs of the visitor services and habitat management programs. Development of a comprehensive riverine/wetland strategic plan will be initiated with the rate of progress determined by staff and resource availability, as well as interest and resource contributions from partners.

Lake and Wetland Habitats: The emphasis of the management direction is to improve the aquatic health of the Refuge's lake and wetland habitats, and to enhance the feeding, resting, and nesting components necessary for a variety of shore/wading birds, waterfowl, and other wildlife species. This will be achieved largely through carp population control. As turbidity decreases and submergent vegetation and associated invertebrate species become more abundant, the productivity of Malheur Lake and of other water bodies within the Refuge (e.g., Boca Lake and Warbler Pond) will increase.

Because of the sheer size and complexity of the aquatic health problem, primarily due to carp, a variety of assessment and control tools will be needed to effectively address it. Existing partnerships such as the Aquatic Health Coalition (made up of Federal, State, nongovernmental organization, and Tribal participants) will assist in strategizing and implementing the most effective suite of control, inventory, funding, and monitoring methods.

Although the overall carp assessment and control strategy for the Harney Basin is currently being considered, it would incorporate methods successfully implemented worldwide and customized, as needed, to suit the Refuge. Strategic assessments of lake, river, and wetland habitats and carp population dynamics would guide control activities and provide enhanced understanding of the system's innate ability to recover from carp impacts. Control strategies would include, but not be

¹ Wetland habitats include wet meadows that depend on flood irrigation during the growing season.

limited to, the application of piscicide, chemo-attractants, chemo-repellants, barriers, commercial harvest, angling, and water manipulation. The need for continued amendments to and the construction of additional strategically placed in-stream structures (i.e., traps, screens, and fish wheels) that allow native fish passage and impede/prohibit carp movement through the system would also be considered.

Riverine Habitat: The Blitzen River and its tributaries currently provide the foundation and lifeblood on which fish and wildlife depend. Because a vast majority of refuge-managed habitats are reliant on irrigation via a complex network of dams, canals, and ditches associated with the river, it is important to understand the connectivity between the Malheur/Mud and Harney Lake systems and associated wetlands in light of carp control. The management direction allows for initiating the development of a comprehensive riverine/wetland strategic plan, which will depend on staff and funding availability. The primary focus of refuge staff is the improvement of lake and wetland aquatic health through carp control. However, we may make efforts to reduce summer river temperatures through changes in water management to increase the cold water barrier, which keeps carp out of wetlands in the upper Blitzen Valley.

The mechanisms for addressing river-related issues will be placed in motion strategically under the management direction by completing necessary assessments and pilot projects as funding, staff time, and resources provided through partnerships allow. The Refuge recognizes that achieving a greater understanding of riverine habitat parameters and opportunities for improvement is very important. If, during the life of this CCP, the minimum carp threshold (e.g., 100 pounds per acre) is met and maintained, more staff time and resources would be directed to addressing whether river rehabilitation efforts are needed and, if so, how such efforts should be identified, prioritized, and achieved.

I&M efforts will place a high priority on information that assists the Refuge in building a baseline data layer that could be used in pursuing riverine activities while furthering our understanding of adjacent habitats. More in-depth, site-specific assessments will be done if opportunities arise (e.g., funding availability and additional refuge staff).

Wetlands and terrestrial habitats will continue to be managed to promote the life-history needs of focal resources (see Appendix E). The overarching theme for the management of wetland and terrestrial habitats will be greater flexibility in identified strategies to adequately meet establishing objectives. Flexibility is critical for maintaining a variety of plant communities within habitats, such as emergent marsh, wet meadow, and dry meadow, to meet foraging, breeding, brood rearing, and other life-cycle needs of migratory birds and other native wildlife. For example, bobolinks and sandhill cranes both depend on wet meadows during the breeding season. They do, however, differ greatly in their use of and the conditions needed within these meadows. To address the wide assortment of needs found within each habitat type, vegetation management tools will address the accumulation of litter and plant community succession. Tools will include, but will not be limited to, traditional late summer haying and autumn/winter rake-bunch grazing (to meet the foraging needs of wildlife species that arrive early) and highly prescriptive warm-season (growing season) grazing, mowing, farming, extended dewatering, etc. (to reclaim acres lost to invasive plants, such as common cattail and reed canarygrass) or to rehabilitate communities that have transitioned beyond desired conditions.

Wildlife viewing, photography, and interpretation, the cornerstones of the public use program, will provide quality opportunities for observing nature. Management under this CCP will be focused on

expanding developed facilities and programs for casual visitors and birders (of all abilities). Both spur and loop trails (at least 1 mile) will be added to allow visitors to explore and learn about wildlife and the Refuge, and several trails will be upgraded or built to Americans with Disabilities Act (ADA) standards for accessibility compliance. A number of specific viewing facilities to enhance visitors experiences, such as viewing overlooks and elevated viewing platforms, will also be upgraded and developed. These projects will include restoring the historic Audubon photography blind at the Refuge Headquarters Display Pond; building two ADA-compliant, first-come, first-served permanent screened photography blinds; and building an elevated viewing platform at Malheur Lake. For advanced birders, the Refuge will maintain and replant cottonwood trees and other non-endemic trees and shrubs at six historic landscapes to continue to provide habitat used by rare and incidental passerines (perching birds or songbirds).

Connecting the hearts and minds of visitors with the Refuge will be accomplished with docent-led tours conducted on a seasonal basis at different locations on the Refuge, and will include opportunities for guided kayak and canoe tours on Malheur Lake. Expanded vehicle access will be available, with year-round vehicle access to Krumbo Reservoir, along the Boat Landing Road near Refuge Headquarters, and the southern portion of the East Canal Road to the confluence of Bridge Creek. In addition, boating that is not directly supporting the fishing program will be available at Krumbo Reservoir to enhance wildlife viewing.

Interpretive features and programs are another high priority, and key interpretive themes will include the significance of the Refuge to breeding and migratory birds, precontact and post-contact historic events, wilderness, geology, aquatic health, water importance, resource challenges, and the National Wildlife Refuge System. A stronger emphasis will be placed on developing and using modern media. The George Benson Memorial Museum at Refuge Headquarters will be enhanced, with interpretive panels added to connect visitors with places and the resources that the Refuge protects. Additional outdoor interpretive panels will be placed at key field sites and will focus on improving aquatic health and associated management activities, and weaving historical events with the ecology of the Refuge. Special events and public presentations by refuge staff and volunteers will be expanded and promoted to enlighten visitors' experiences.

Welcome and Orientation: Refuge staff will emphasize improvements in welcome and orientation features, with an emphasis on the use of modern and traditional media to reach and orient visitors. Up to eight outdoor welcome and orientation panels will be located near Refuge entrances and at other congregation areas to direct and guide visitors during their visit. To welcome visitors, developed sites with visitor amenities, such as picnic tables, shelters, and vault toilets, will be upgraded and at least five new developed sites features will be built. An enlarged visitor contact station and gift shop at Refuge Headquarters and a seasonal contact station at P Ranch will be built to provide personal contact between visitors and Refuge staff and volunteers.

Environmental education will be provided, but with more strategic use of Refuge staff time and resources. Strategies will include coordinating efforts with other environmental education initiatives. Existing modules from national and regional programs, such as the Junior Duck Stamp Program and International Migratory Bird Day, will be used as refuge staff and volunteers become available. An outdoor environmental education shelter and learning area at Refuge Headquarters will be built to augment the existing environmental education program and other environmental education initiatives.

Hunting opportunities for upland game will be enhanced by improving the Saddle Butte access on the north side of Malheur Lake and extending the season opener to the fourth Saturday of October (approximately three weeks earlier than current program) to the end of the State pheasant season in the Buena Vista Hunt Unit. The northern part of Malheur Lake and the Boundary Hunt Unit will remain open under slightly modified regulations.

The waterfowl hunt will also be enhanced by promoting a youth hunt and with improvements to the Saddle Butte access. In addition, new waterfowl hunt areas will be provided (approximately doubling or tripling the existing hunt area) by opening a portion of the south-central area of Malheur Lake and within the existing Buena Vista Hunt Unit. The season opener for the new waterfowl hunt units will be on the fourth Saturday of October to the end of the State waterfowl season. One new access point with an expanded parking area and an enhanced boat launch will be provided on the Boat Landing Road near Refuge Headquarters to access the new hunt unit of Malheur Lake. In partnership with potential users, the Refuge will also support adding accessible facilities in the Buena Vista Hunt Unit for waterfowl hunters with disabilities.

Fishing opportunities along the upper Blitzen River, the southern portion of East Canal, and Mud and Bridge creeks will continue. Vehicle access will be allowed on the East Canal Road north to the confluence of Bridge Creek to make this opportunity more accessible for visitors and will enable access to Granddad Reservoir located on BLM land. In addition, a new pedestrian crossing at Bridge Creek will enhance fishing access to the 7 miles of Bridge Creek located west of the East Canal to its confluence with the Blitzen River. Opening a new bank fishing opportunity with a parking area at Sodhouse Lane to the bridge on the Boat Landing Road, part of the Headquarters Loop Trail, will open a new area to fishing on the Blitzen River. The season for this fishing unit will be from August 1 to September 15. Orientation panels with maps, brochures, regulations, and additional information will be added to fishing areas to provide information to visitors about fishing opportunities.

At Krumbo Reservoir, year-round access will be provided for wildlife viewing, boating, and fishing in coordination with State seasons and will increase public fishing opportunities. The stocking program of triploid rainbow trout will continue in coordination with ODFW, and steps will be undertaken to conduct a genetic introgression study on redband trout.

Volunteer Program: To help enhance the public use program and other refuge programs, a full-time volunteer coordinator will be added to the staff. The volunteer coordinator will increase recruitment, retention, and the return rate of volunteers. The position will also expand the program to better use facilities and refuge staff, assist with building partnerships, and increase public outreach.

Protection of cultural and paleontological resources will be strengthened by the development, in cooperation with partners, of step-down management plans for administrative sites where historic or prehistoric resources are present, and for archaeological and paleontological resources. Interpretation of historic sites will be expanded through the development and implementation of site-specific interpretive plans. Opportunities for Native Americans to collect plant materials for traditional uses will be expanded. I&M of archaeological resources will increase as part of step-down management plan implementation.

Boundary Unit Lands: Some Refuge lands located within the Boundary Hunt Unit (Refuge lands west of State Highway 205 and isolated parcels in the Krumbo watershed) are managed by the BLM under cooperative land management agreements with the USFWS. Under these agreements, typical BLM land management practices and uses are allowed to occur. Upon final signature of this CCP,

these cooperative land management agreements will be allowed to expire, except for those pertaining to the use of Diamond and Nine Mile corrals. Refuge lands will be managed by the USFWS to further Refuge purposes, until a land interchange or new cooperative land management agreement is negotiated with BLM.

Energy Independence: The refuge staff will seek to become energy independent and carbon negative, and will continue to emphasize partnerships to maximize adaptive management.

Inventory and monitoring for all programs will be strengthened. Program-wide I&M plans will be developed to guide annual management actions. The fish, wildlife, and vegetation plans will emphasize focal species and national monitoring efforts. A geodatabase will be created to track data collected under these plans.

Adaptive Management: The Refuge will be using an adaptive management (AM) decision-making process to implement management strategies authorized in the CCP. AM is a science-based public participation process for evaluating and adjusting a conservation effort relative to goal achievement as experience and knowledge are gained through implementation, study, and discussion. The Refuge and its collaborative partners support the fact that AM promotes flexible decision making, which can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. As the CCP is implemented, AM will help the Refuge achieve diverse goals while enhancing wildlife benefits, advancing scientific knowledge, and improving working relationships among stakeholders.

The principle of AM recognizes that ecosystem function is inherently complex and often results in knowledge gaps. AM implementation means a firm commitment to the development of measurable outcomes and the application of rigorous evaluation and monitoring methods to determine whether management goals are being met. Careful monitoring of these actions advances scientific understanding and helps adjust policies or operations as part of an ongoing learning process. This is not a trial-and-error process but rather emphasizes learning while doing, which recognizes the importance of incorporating new information as it becomes available. AM requires flexibility and an ability to acknowledge risks and failures and use new knowledge in a constructive manner to make adjustments while building a foundation for ongoing learning/adjustment. This may include changing which Resources of Concern are used for habitat management as a result of new data acquired during the Inventory and monitoring process.

The Refuge is committed to a rigorous and inclusive AM approach to enhance public confidence in the Refuge's ability to transfer the theory into practice. The Refuge recognizes that there is a critical need for transparency as CCP implementation moves forward. This transparency as it pertains to AM needs to include both the learning and decision-making processes. The following discussion describes how the Refuge will move forward through AM.

- ***Information Sharing/Learning:*** The Refuge is committed to an AM process that will bring diverse interests together through various forums to share information and site-specific results so that all those engaged, including the Refuge, can learn together (Figure 2-1). These forums will evolve over time but will include collaborative mechanisms with others such as (and potentially evolving from) the collaborative groups that have been active during the CCP process, including the Aquatic Health Coalition, the Ecology Work Group, and an evolution of the Collaborative Planning Group. The timing and frequency of information sharing and learning will be determined by how rapidly new information is being acquired,

level of partners’ interest and engagement, ecological cycles, and the forum being used. The Refuge will also share the results of its I&M work on an ongoing basis and strive to be responsive to partners’ requests for open discussion and collaboration in assessing the need for adaptive changes in management to achieve the goals and objectives of the CCP.

- Decision Making:** As the Refuge and our partners learn through the AM process, new information may show the need for adjustments (e.g., selecting new habitat focal species or evaluation metrics), confirm existing strategies, or identify additional information (Figure 2-1). Based on the best information available at the time, the Refuge will make decisions for future management actions. As with the sharing and learning aspects of AM, the Refuge recognizes the importance of transparency for decisions made during the AM process. The Refuge is committed to bringing together interested parties to assist with the evaluation of available information, as well as consultation about management options and their implications prior to making course-changing decisions. This process does not diminish the Refuge’s legal authority to make decisions but rather serves to enhance the decision making process by enabling the Refuge to approach issues from multiple perspectives thereby finding creative solutions to complex challenges.

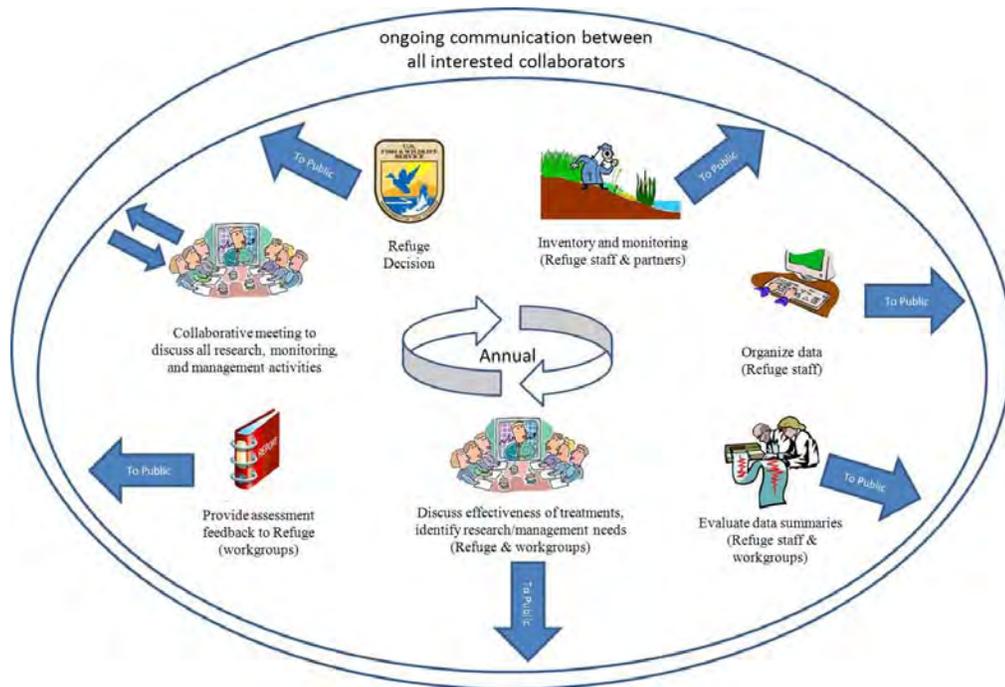


Figure 2-1. Adaptive Management Model

Implementation Subject to Funding Availability: Actions will be implemented over a period of 15 years as funding becomes available. Project priorities are described in Appendix C. The Refuge will continue to work with partners to implement the CCP by sharing results, providing updates on successes and challenges, initiating discussions, encouraging participation, and hosting working groups.

Tribal Coordination: There will be regular communication with the Burns Paiute Tribe. This tribe is the major local tribal entity the Refuge will coordinate and consult with regarding issues of shared

interest. Currently, the Service coordinates with the Tribe on issues related to the Native American Graves Protection and Repatriation Act (NAGPRA; [P.L. 101-601](#)) and National Historic Preservation Act (NHPA; [16 U.S.C. 470 et seq.](#)).

State Coordination: The Service will continue to maintain regular discussions with ODFW. Key topics for discussion will be wildlife monitoring, fisheries management (including fish passage and barriers), hunting and fishing seasons and regulations, and the management of species of concern (i.e., sage-grouse).

Harney County Court Coordination: The Service will continue to maintain regular discussions with the Harney County Court as actions under this plan are implemented over the next 15 years.

Maintenance of Infrastructure to Support Management of Wetlands and Meadows: Efforts to enhance the water management system will be made throughout the life of the CCP, to reflect aquatic health (e.g., carp control) and other habitat management needs and constraints. Actions will be directed by existing water rights, funding opportunities, and refuge maintenance priorities.

Refuge Fire Management: The current Refuge Fire Management Plan (FMP) based on the 1985 Refuge master plan and step-down plans was updated in 2010. Under this FMP the Refuge is designated as a single Fire Management Unit (FMU). The FMP will be revised and approved at the Regional level and will act as a step-down plan to the CCP. An approved FMP allows a manager to consider a wide range of management responses to wildfires and to conduct prescribed fires. The FMP contains strategic and operational elements that describe how to manage applicable fire program components such as: response to unplanned ignitions, hazardous fuels and vegetation management, burned area emergency stabilization and rehabilitation, prevention, community interactions and collaborative partnerships roles, and monitoring and evaluation programs.

Prescribed fire will be used in areas where it is the most appropriate tool to achieve habitat and hazardous fuels reduction goals. Prescribed burns will generally be conducted in the late winter to meet litter management objectives, but may be done at other times depending on desired outcomes.

Climate Change: The refuge staff will participate in and contribute to climate change assessment efforts, including those underway at a landscape scale, such as the Great Basin Landscape Conservation Cooperative (LCC). LCCs are formal science-management partnerships consisting of the Service, other Federal agencies, states, Tribes, nongovernmental organizations, universities, and other entities. LCCs provide science support, biological planning, conservation design, research, and design of inventory and monitoring programs to address climate change and other environmental stressors in an integrated fashion. As needed, objectives and strategies will be adjusted to assist in enhancing refuge resources' resiliency in the face of climate change. The refuge staff will also continue to pursue and engage in mechanisms to conserve energy in refuge operations, including the use of fuel-efficient vehicles.

Partnerships: Partnerships will be maintained and developed to enhance collaboration in support of fish and wildlife resources, recreational opportunities, cultural resources, paleontological resources, educational programs, and to explore ways to share funding and seek grants on projects of mutual interest. Partnerships will also be used to work with others to accomplish common goals, promote mutual understanding, encourage environmentally friendly development, and promote ecotourism opportunities. Workshops and training sessions with professional colleagues and the general public

will be developed to obtain ideas, techniques, and support for management decisions to address natural process management, agency mission, and refuge objectives.

Volunteer Opportunities: Volunteers are recognized by the Refuge as key components of the successful management of public lands, and they are vital to implementation of refuge programs, plans, and projects, especially in times of declining budgets. Volunteer opportunities will be maintained and expanded to best use facilities and refuge staff, and to assist with building partnerships and public outreach. A volunteer management plan will be developed and will address the following for all refuge programs: job descriptions, volunteer/staff roles, recruitment and retention of high-quality volunteers, orientation/training, housing, performance evaluations, recognition, administration of the Malheur Wildlife Associates, promotion of the role of the Malheur Wildlife Associates, and Malheur Wildlife Associates program evaluation.

Transportation Coordination: Roads, bridges, and trail systems play a vital role in providing access to the public for compatible wildlife-dependent recreation opportunities. The Service will look for opportunities to partner with the Oregon Department of Transportation (ODOT), Burns District of the BLM, and Harney County to maintain and improve safe and appropriate transportation access in and around the Refuge.

Refuge Revenue Sharing Payment: Annual payments to Harney County under the Refuge Revenue Sharing Program will continue according to the established formula and subject to payments authorized by Congress. Total payments made to the County in recent years are listed in Section 5.8.5.

Sustainable Practices for Maintenance and Updating of Existing Infrastructure: Periodic maintenance and updating of refuge buildings and facilities will be necessary. Periodic updating of infrastructure is necessary for safety and accessibility and to support staff and management needs and is incorporated in the Federal Business Management System and Environmental Management Plan. The Refuge will seek to become energy independent and carbon negative by implementing green technology and sustainable practices.

Endangered Species Act Section 7 Consultations: All projects will be compliant with the Endangered Species Act (ESA, [16 U.S.C. 1531-1544](#) et seq.). Section 7 consultation was not completed programmatically for the CCP. The need for Section 7 consultations for special projects or actions not described in this plan (e.g., management actions related to aquatic health) will be conducted on a case-by-case basis.

Section 106 Compliance: Any new ground-disturbing projects or modifications (e.g., removal of historic water control structures or dams) will undergo a review under Section 106 of the NHPA ([16 U.S.C. 470 et seq.](#)).

Integrated Pest Management (IPM): In accordance with [517 DM 1](#) and [569 FW 1](#), an integrated pest management (IPM) approach will be used, where practicable, to eradicate, control, or contain pest and invasive species (herein collectively referred to as pests) on refuge lands. IPM will involve using methods based upon effectiveness, cost, and minimal ecological disruption, which considers minimum potential effects to non-target species and the refuge environment. Pesticides may be used where physical, cultural, and biological methods or combinations thereof, are impractical or incapable of providing adequate control, eradication, or containment. If a pesticide is needed on refuge lands, the most specific (selective) chemical available for the target species will be used

unless considerations of persistence or other environmental and/or biotic hazards preclude it. In accordance with [517 DM 1](#), pesticide usage will be further restricted because only pesticides registered with the U.S. Environmental Protection Agency (USEPA) in full compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; [7 U.S.C. prec. 121](#)) and as provided in regulations, orders, or permits issued by USEPA may be applied on lands and waters under refuge jurisdiction.

Environmental harm by pest species refers to a biologically substantial decrease in environmental quality as indicated by a variety of potential factors including declines in native species populations or communities, degraded habitat quality or long-term habitat loss, and/or altered ecological processes. Environmental harm may be a result of direct effects of pests on native species including preying and feeding on them; causing or vectoring diseases; preventing them from reproducing or killing their young; out-competing them for food, nutrients, light, nest sites or other vital resources; or hybridizing with them so frequently that within a few generations, few if any truly native individuals remain. Environmental harm also can be the result of an indirect effect of pest species. For example, decreased waterfowl use may result from invasive plant infestations reducing the availability and/or abundance of native wetland plants that provide forage during the winter.

Environmental harm may involve detrimental changes in ecological processes. For example, cheatgrass infestations in shrub-steppe greatly can alter fire-return intervals, displacing native species and communities of bunchgrasses, forbs, and shrubs. Environmental harm may also cause or be associated with economic losses and damage to human, plant, and animal health. For example, invasions by fire-promoting grasses that alter entire plant and animal communities eliminating or sharply reducing populations of many native plant and animal species can also greatly increase fire-fighting costs.

See Appendix G for the Refuge's IPM program documentation to manage pests. Along with a more detailed discussion of IPM techniques, this documentation describes the selective use of pesticides for pest management on refuge lands, where necessary. Throughout the life of the CCP, most proposed pesticide uses on refuge lands will be evaluated for potential effects to refuge biological resources and environmental quality. These potential effects will be documented in "Chemical Profiles" (see Appendix G). Pesticide uses with appropriate and practical BMPs for habitat management as well as cropland/facilities maintenance will be approved for use on refuge lands where there likely will be only minor, temporary, and localized effects to species and environmental quality based upon non-exceedance of threshold values in Chemical Profiles.

Hazard Analysis and Critical Control Point Plan: Hazard analysis and critical control points planning (HACCP) is a tool to help natural resource managers identify critical control points in their activities to decrease the spread of invasive species. The HACCP Wizard Version 2.04 (<http://www.haccp-nrm.org/Wizard/default.asp>) will be used to construct plans for staff, contractors, volunteers, and other users of the refuge to evaluate their activities and address ways to conduct their activities to limit the chance of spreading invasive species.

Water Rights: The right to use water on the Refuge is managed through the State of Oregon's Water Resources Department. Water rights in Oregon are managed by two basic principles: beneficial use and first in time/first in right. Almost all water use on the Refuge has some form of a State-certified water right. The exception is springwater in the Double-O Unit of the Refuge, which is threatened by groundwater withdrawals in the area. To protect the habitats and values associated with springs, the Service will take steps to file a groundwater right.

Water Quality: Water quality is addressed through the ODEQ. Refuge-specific water quality guidelines have not yet been established through a formal TMDL study conducted by the State. Although water quality impairments exist in the Blitzen River before it reaches the refuge boundary, various refuge-led studies have indicated a continued increase in temperature and turbidity and a decrease in dissolved oxygen levels within some refuge water bodies (see Chapter 3) during specific times of the year. Refuge staff will continue to identify and implement best management practices to address water quality.

Blitzen River Water Management: The Refuge will continue to maintain a minimum flow of 25 cfs in the Blitzen River to benefit aquatic resources.

Research, Monitoring, and Inventory: Refuge staff will continue to work with others to share information and expertise on habitat management, terrestrial and aquatic health, and restoration/rehabilitation techniques. Partnerships with local universities, nongovernmental organizations, Tribes, State and local agencies, and others will be expanded to conduct research that will advance sound science associated with decision making on the Refuge.

Malheur Refuge State and Transition Model: The Refuge is partnering with ecologists, wildlife biologists, and scientists from various State and Federal agencies and nongovernmental organizations to develop the “Malheur Refuge State-and-Transition Model” (STM) to increase understanding of the wetlands managed by the Refuge. It describes various habitat types along a hydrological gradient and discusses the conditions that likely cause transitions between associated plant assemblages. The STM will serve as a “road map” for managing wetlands and uplands toward target habitat conditions and will provide increased understanding of the short- and long-term effects of management treatments on refuge habitats.

Non-priority Uses: Non-priority wildlife-dependent recreational uses will be allowed at the Refuge if found appropriate and compatible. Certain uses will be allowed under the stipulations identified in Appendix B. Incidental uses such as horseback riding will be permitted only on the Center Patrol Road. Bicycling and cross-country skiing will be permitted on all public roads; pets will be permitted in designated areas. All-terrain vehicle (ATV) use is permitted in conjunction with the grazing and haying program. Recreational use of ATVs, snowmobiles, or dirt bikes will not be permitted anywhere on the Refuge. Special stipulations apply for ATV use on the Refuge as outlined in Appendix B.

Prohibited activities include fires, swimming, camping, and collecting natural objects (such as plants, animals, minerals, antlers, etc.), and objects of antiquity. See Appropriate Use Determinations (Appendix A) and Compatibility Determinations (Appendix B) for more information. Such recreational activities not specifically addressed in this document may be allowed on refuge lands, if the Refuge Manager determines that they are appropriate and compatible.

Predator Control: Although such an action is often justifiable, specific attainable objectives must be determined before conducting predator control. It has been noted, for example, that removal of coyotes (*Canis latrans*) often leads to an increase in other predator populations that can be even more detrimental to wildlife production (raccoons (*Procyon lotor*), mink (*Neovison vison*), etc.). If predator control is deemed necessary during the life of the CCP, the proper public process will be followed. Productivity of select key avian species will be monitored under the guidance of the I&M plan to assess whether the Refuge is serving as a source or sink for local avian populations, and if the

Refuge is not serving as a source, management options including manipulation of habitat conditions and predator control will be considered.

2.4 Summary of Future Management

Table 2-1 represents a conceptual future of the Refuge using best science to determine likely outcomes. A reliance on adaptive management is key to successfully incorporating the broad array of factors that will influence implementation of the plan. Numbers denoted in the table represent a range of possible futures and are not attached to specific ground locations unless indicated otherwise.

Table 2-1. Summary of Future Management

Management Theme	Management Direction
<p>Top priority will be to improve the aquatic health of lakes and wetlands.</p> <p>Create a more developed and structured visitor experience with additional birding, fishing, and hunting opportunities.</p> <p>Initiate the development of a comprehensive riverine/wetland rehabilitation plan.</p>	
Habitat Management	
Lacustrine (lakes)	Major emphasis on carp population control for restoring aquatic health (see Invasive Species Control).
Riverine	Strategic approach beginning with most critical, foundational assessments and pilot studies and moving toward the creation of an integrated wetland/riverine rehabilitation plan sometime in the near future, most likely beyond the life of this CCP. Once carp control objectives are reached and successfully maintained (e.g., 100 pounds per acre in Malheur Lake), resource emphasis may expedite the development and implementation of the above-mentioned plan. Aquatic health inventory, monitoring and carp control will occur.
Woody Riparian	Maintain and enhance 1,000-1,500 acres.
Palustrine Emergent (seasonally flooded wet meadow)	<ul style="list-style-type: none"> Enhance and maintain 20,000-25,000 acres An increase in overall meadow acreage ($\pm 2,000$ acres) and enhanced diversity of meadow/marsh complexes Increase management flexibility by utilizing State-and-Transition Model to address management issues with best available science (e.g., summer grazing)
Palustrine Emergent (seasonally flooded marsh associated with wet meadow)	<p>Increased management flexibility to enhance and maintain 15,000-16,000 acres.</p> <p>Increased blocking of carp movement and redband trout intrapment by installing fish screens. Increased inventory and monitoring of aquatic health.</p>
Palustrine Open Water/Emergent (semipermanently flooded Wetland Impoundment)	<p>Enhance and maintain 2,200-2,800 acres of wetland impoundments.</p> <p>Increased blocking of carp movement and redband trout intrapment by installing fish screens. Increased inventory, monitoring research and assessment of aquatic health.</p>
Dry Meadow	<p>Enhance and maintain 4,500-5,500 acres:</p> <ul style="list-style-type: none"> Idle strategy dominates Treatment frequency determined by monitoring of structure and vigor

Management Theme	Management Direction
Salt Desert Scrub	Maintain 40,000 acres.
Sagebrush Lowland	Maintain 4,300-4,500 acres.
Sagebrush Steppe	Maintain 14,000-15,000 acres: <ul style="list-style-type: none"> • Continue to eradicate invasive western juniper • Investigate the diversification of crested wheatgrass seedings. • Implement projects to add native plant diversity in crested wheatgrass seedings • Conduct experimental burns and other treatments (shrub control, etc.) to increase desirable understory cover in pertinent plant communities
Dune	Protect and maintain 6,300 acres with minimal management.
Playa	Protect and maintain 29,000 acres with minimal management.
Cropland	Increase row crop up to 1,000 acres.
Cold and Hot Springs	Maintain and enhance 236 acres. Increased inventory, monitoring research and assessment of aquatic health.
Cliffs, Rimrocks, and Outcropping	Maintain current acres.
Special Protection Areas	
RNA and WSA Management	Continue to manage as closed areas except for research and/or maintenance activities and docent- or staff-led tours.
Wilderness Study Area	Adjust Harney Lake WSA proposal to reflect 2010 wilderness inventory of 31,157 acres.
Refuge Boundary and Management Area	
Lands West of State Highway 205 and East of Krumbo Reservoir	With BLM, explore opportunities to coordinate land management and enhance conservation in the Refuge’s Boundary Unit adjacent to BLM land, considering mechanisms such as cooperative management agreements and/or interchange of lands. Because the identified land area is a thin sliver of uneven ground between road and rimrock, and is unmarked and unfenced in most areas, it is difficult to manage under Refuge regulations. No difference in public use opportunity is envisioned.
Invasive Species Control	
Carp Control	Following assessments (see Goal 13), use appropriate techniques to aggressively control carp that can be applied to the diversity of aquatic habitats throughout the watershed. IPM strategies to control carp will include, but not be limited to, the application of piscicide, chemo-attractants, chemo-repellants, barriers, commercial harvest, angling, and water manipulation. In-stream structures (i.e., traps, screens, and fish wheels) that address native fish passage issues and the prohibition of carp movement through the system will also be considered.
Invasive Species Control	Increase monitoring and control for undesirable species, determine efficacy of treatments, and map areas at risk of exceeding threshold levels (see Goals 1-4 for thresholds).
Wildland Fire and Hazardous Fuels Management	
Biological Fuels Treatment	<ul style="list-style-type: none"> • Use wildfire, prescribed fire, and mechanical treatment to manage biological fuels. • Continue to coordinate with the Burns Interagency Fire Zone. • Use chemical treatment to manage biological fuels.

Management Theme	Management Direction
Wildland Fire Prevention and Response	<ul style="list-style-type: none"> • Continue to coordinate with the Burns Interagency Fire Zone. • Where required, suppress wildfires, but consider objective opportunities for resource benefits and ability to safely manage fires.
Hazardous Fuels	<ul style="list-style-type: none"> • Use wildfire, prescribed fire, and mechanical treatment to manage hazardous fuels • Continue to coordinate with Burns Interagency Fire Zone • Use chemical treatment to manage hazardous fuels.
Water Resources	
Watersheds	<ul style="list-style-type: none"> • Continue to improve aquatic health in Silvies, Double-O, and Blitzen River watersheds by working with public and private partners • Work with public and private partners to protect spring migratory habitat (e.g., snow goose) in the Harney Basin via available land protection and stewardship programs
Water Rights	<ul style="list-style-type: none"> • Prove up on new winter water rights for the Blitzen River and tributaries • Finalize transfer of existing Blitzen River water rights to wildlife refuge management • Establish a groundwater right for the springs in the Double-O Unit.
Water Delivery System Assessment and Feasibility	Complete a full assessment of water control structures of water delivery system for water management efficacy.
Inventory, Monitoring, Scientific Assessments, and Research	
Inventory and Monitoring	<ul style="list-style-type: none"> • Inventory, monitor, and assess fish, wildlife, and vegetation to guide annual management actions • Re-establish a program-wide I&M plan around focal species and national monitoring efforts • Design a geodatabase for inventory and monitoring surveys conducted
Research	Focus on aquatic health and wetland/terrestrial habitat management. Initiate development of the river/wetland rehabilitation plan. Systematically conduct research to further aquatic health and carp control on the refuge.
Assessment	<ul style="list-style-type: none"> • Conduct aquatic health assessments on focal areas of the refuge • Assess carp population dynamics and migratory patterns. • Conduct wetland and terrestrial habitat assessments. • Assess habitat response to management actions primarily from carp control and water connectivity through the watershed • Assess water delivery system to determine water control structures that deter carp passage • Commence assessment of riverine habitat characteristics that will influence future restoration efforts
Welcome and Orientation	
Welcome and Orientation Panels	Maintain and update 4 existing outdoor welcome and orientation panels at: <ul style="list-style-type: none"> • Narrows Pull-out • Refuge Headquarters • Buena Vista • Frenchglen

Management Theme	Management Direction
	<ul style="list-style-type: none"> • Krumbo Reservoir • P Ranch • Harney Lake • Double-O
<p>Developed Sites with Visitor Amenities (i.e., picnic tables, shelters, vault toilets)</p>	<p>Maintain five developed sites at:</p> <ul style="list-style-type: none"> • Refuge Headquarters • Buena Vista • Krumbo Reservoir • P Ranch <p>Provide all or some described developed sites as shown:</p> <p>Complete Developed Sites</p> <ul style="list-style-type: none"> • Double-O <p>Vault Toilets Only</p> <ul style="list-style-type: none"> • Sod House Ranch <p>Picnic Tables and Shelters Only</p> <ul style="list-style-type: none"> • Refuge Headquarters (ADA-compliant) • Buena Vista Overlook • P Ranch
<p>Visitor Contact</p>	<ul style="list-style-type: none"> • Maintain year-round visitor contact station/gift shop at Refuge Headquarters • Build an enlarged visitor contact station and gift shop at Refuge Headquarters • Enhance George Benson Memorial Museum to meet ADA standards and to meet preservation standards to protect specimens. • Establish a seasonal contact station at P Ranch, and provide staffing as available with volunteers during spring, summer, and fall • Continue to consider/participate in discussions for an interagency visitor facility off-refuge
<p>Wildlife Observation and Wildlife/Nature Photography</p>	
<p>Docent-led Tours</p>	<p>Provide docent-led tours in conjunction with the annual John Scharff Migratory Bird Festival.</p> <p>Provide advertised docent-led tours, approximately monthly, to a variety of audiences at different locations on the Refuge, including kayaking and canoeing tours on Malheur Lake.</p>
<p>Auto Tour Route and Vehicular Access</p>	<p>Maintain refuge public roads on:</p> <ul style="list-style-type: none"> • 42-mile Blitzen Valley auto tour route (Center Patrol Road) year-round • Seasonal access to Krumbo Reservoir from fourth Saturday of April through October 31 <p>Provide year-round vehicle access and vehicle pull-offs when road conditions are not hazardous at:</p> <ul style="list-style-type: none"> • Boat Landing Road • Krumbo Reservoir • East Canal Road to the confluence of Bridge Creek

Management Theme	Management Direction
Site Management for Rare and Incidental Passerines and Historic Landscapes	Prepare and implement site plans, to manage vegetation and maintain trees and shrubs at: <ul style="list-style-type: none"> • Refuge Headquarters • Sod House Ranch • Benson Pond • Witzel Field • Barnyard Springs • P Ranch
Interpretation	
Primary Interpretive Themes	Maintain existing interpretive programs to include natural and historic resources themes. Include: <ul style="list-style-type: none"> • Historical and current significance of the Refuge to breeding and migratory birds • Precontact and post-contact history • CCC work in the area • Wilderness • Geology • Aquatic health • Water’s importance, hydrology, and movement through the landscape • Refuge’s primary management objectives, and management challenges, and methods for wildlife, habitat, and other resources • Role and importance of the National Wildlife Refuge System • An understanding of visitors’ relationships to, and impacts on, natural and historic resources to become stewards of the land
Modern and Traditional Media	Maintain and update existing modern and traditional media as shown: <ul style="list-style-type: none"> • Website and brochures Make greater use of modern media (CDs, podcasts, social media, etc.).
Panel Locations	Maintain five sites with outdoor interpretive panels at: <ul style="list-style-type: none"> • Narrows Pull-out • Refuge Headquarters • Sod House Ranch • Buena Vista Overlook • P Ranch Provide indoor interpretive panels in the George Benson Memorial Museum to connect visitors with places and the resources the Refuge protects Provide additional outdoor interpretive panels at key field sites to appropriately implement key interpretive themes focusing on improving aquatic health and associated management activities, and weaving historic events with ecology of the Refuge
Special Events	Participate in four local events, on- and off-refuge: <ul style="list-style-type: none"> • John Scharff Migratory Bird Festival (April) • Free Fishing Day (June) • Invasive Carp Awareness (August) • Harney County Fair (September) Provide three additional local events, on- and off-refuge, with docent-led

Management Theme	Management Direction
	activities, booths, educational materials, etc. for: <ul style="list-style-type: none"> • International Migratory Bird Day (May) • Ranching Heritage Day combined with Invasive Carp Awareness (August) • National Wildlife Refuge Week (October)
Presentations	Provide public presentations by refuge staff and volunteers to a variety of visiting groups upon request. Advertise through modern and traditional media that public presentations by refuge staff and volunteers are available, approximately monthly, for visiting groups Coordinate additional public presentations with other environmental education partners
Environmental Education	
Environmental Education Program	Reach approximately 500 students, on- and off-refuge, using refuge staff and volunteers with: <ul style="list-style-type: none"> • Local first and third graders • John Scharff Migratory Bird Festival Fun Fair and “Conservation through the Arts” • Free Fishing Day • Other environmental education programs upon request When refuge staff and volunteers are available, use and implement existing curricula, and national and regional environmental education modules, such as the Junior Duck Stamp Program, International Migratory Bird Day, etc., on- and off-refuge Coordinate and assist with local environmental education initiatives upon request
Great Basin Society/Malheur Field Station	Review and revise as needed the cooperative Agreement between the Great Basin Society/Malheur Field Station and the Refuge.
Environmental Education Facilities	<ul style="list-style-type: none"> • Build an outdoor shelter at Refuge Headquarters where environmental education activities can be conducted during inclement weather • Provide an outdoor learning area at Refuge Headquarters for existing environmental education programs, and efforts with other environmental education initiatives
Hunting	
Upland Game	Maintain upland game hunting at: <p>Malheur Lake Hunt Unit</p> <ul style="list-style-type: none"> • 26,200 acres on north side of Malheur Lake; Open pheasant season same as State • Enhance by improving Saddle Butte access on the north side of Malheur Lake <p>Buena Vista Hunt Unit</p> <ul style="list-style-type: none"> • 36,000 acres • Extend season opener from the fourth Saturday of October to the end of State pheasant season <p>Boundary Hunt Unit</p> <ul style="list-style-type: none"> • 2,600 acres west of State Highway 205 and in Krumbo Creek area;

Management Theme	Management Direction
	<p>Open to deer and pronghorn west of State Highway 205 and south of Foster Flat Road; Open to upland gamebirds, rabbit, and coyote in all Unit areas, according to State regulations.</p> <ul style="list-style-type: none"> • Include Krumbo Creek area for pronghorn and deer.
Waterfowl	<p>Malheur Lake Hunt Unit</p> <ul style="list-style-type: none"> • 26,200 acres on north side of Malheur Lake; Open waterfowl season same as State; Nonmotorized or electric boats permitted • Promote a youth hunt opportunity on State-designated weekend in the northern Malheur Lake Hunt Unit • Enhance by improving Saddle Butte access on the north side of Malheur Lake • Expand allowable boundary to include south-central area of Malheur Lake with special date regulations of fourth Saturday of October through end of State waterfowl season • Open new boat access for nonmotorized or electric boats on Malheur Lake at the airboat launch site near Refuge Headquarters with expanded parking area and an ADA-compliant boat launch with special date regulations of fourth Saturday of October through end of State waterfowl season • At low water (<10,000 acres), close Malheur Lake to waterfowl hunting <p>Buena Vista Hunt Unit</p> <ul style="list-style-type: none"> • Open hunt unit to waterfowl hunting with special date regulations of fourth Saturday of October through end of State pheasant season; boats will not be permitted • Support reasonable waterfowl hunting opportunities that comply with the ADA in partnerships with potential users <p>Boundary Hunt Unit</p> <ul style="list-style-type: none"> • 2,600 acres west of State Highway 205 and in Krumbo Creek area; Open waterfowl season same as State
Fishing	
Stream Fisheries	<ul style="list-style-type: none"> • Maintain fisheries at: <ul style="list-style-type: none"> South Fishing Loop Upper Blitzen River, southern portion of East Canal, and tributaries open year-round to walk-in access; redband trout with special regulations • Allow drive-in access on East Canal Road to the confluence of Bridge Creek with access to Granddad Reservoir (BLM), except when road conditions are hazardous • Build a new pedestrian crossing at Bridge Creek to access a portion of the fishable area west of East Canal to its confluence with the Blitzen River • Open new seasonal bank fishing opportunity from Sodhouse Lane to the bridge on the Boat Landing Road, part of the Headquarters Loop Trail, from August 1 through September 15 • Develop five panels with maps, brochures, regulations, and additional information at main entrance points
Reservoir Fishery	<ul style="list-style-type: none"> • Maintain fisheries at:

Management Theme	Management Direction
	<p>Krumbo Reservoir</p> <p>Open fourth Saturday of April through October 31 to drive-in access and to nonmotorized or electric boats; stocked with triploid rainbow trout.</p> <ul style="list-style-type: none"> • Allow year-round, drive-in access, except when road conditions are hazardous. • Allow year-round boating access (nonmotorized and electric boats), except when reservoir begins to ice over. • Conduct genetic introgression study on redband trout in coordination with ODFW. • Develop one panel with maps, brochures, regulations, and additional information at main parking area.
Volunteer Program and Partnerships	
Volunteer Program	<p>Maintain volunteer program:</p> <ul style="list-style-type: none"> • Runs eight months of the year (March-October) • Over 5,000 hours are generated, with at least a 50% return rate <p>Hire a full-time volunteer coordinator position to:</p> <ul style="list-style-type: none"> • Increase recruitment, retention, and return rate of volunteers • Expand the program to best use facilities and refuge staff • Assist with building partnerships and increase public outreach
Law Enforcement	
Regulations	<p>Continue to post regulations at key welcome and orientation sites, as well as locations where fishing and hunting uses predominate (Krumbo Reservoir, Malheur Lake, Buena Vista Unit, etc.).</p> <p>Improve all posting of regulations at key welcome and orientation sites, as well as locations where fishing and hunting uses predominate.</p>
Staffing/Field Presence	<p>Maintain current law enforcement staffing. Continue to emphasize information, education, and friendly presence in the field during key seasons.</p>
Cooperative Assistance	<p>Continue cooperative relationships and agreements with Oregon State Police and Harney County Sheriff's office.</p>
Trespass Cattle	<p>Continue to fence in certain refuge boundary areas to minimize trespass cattle.</p> <p>Improve all fencing in certain refuge boundary areas to minimize trespass cattle.</p>
Transportation	
Public Roads	<p>Maintain current refuge public roads at:</p> <ul style="list-style-type: none"> • 42-mile Blitzen Valley auto tour route (Center Patrol Road) • Krumbo Reservoir • P Lane <p>Enhance:</p> <ul style="list-style-type: none"> • 42-mile Blitzen Valley auto tour route (Center Patrol Road) • P Lane • Boat Landing Road • East Canal Road to the confluence of Bridge Creek • Double-O Road • Saddle Butte hunt access

Management Theme	Management Direction
Pull-offs	Develop additional vehicle pull-offs (1-2 vehicle lengths) at: <ul style="list-style-type: none"> • Boat Landing Road • 42-mile Blitzen Valley auto tour route (Center Patrol Road) • Krumbo Lane • East Canal Road to the confluence of Bridge Creek
Parking Areas	Develop additional parking areas at: <ul style="list-style-type: none"> • Bridge on Boat Landing Road • Airboat launch site (to ADA standards) • East Canal at the confluence of Bridge Creek
Cultural Resources	
Cultural Resource Management and Protection	<ul style="list-style-type: none"> • Prohibit access to sensitive areas. Continue law enforcement patrols to monitor and protect cultural resources. Continue cultural resource surveys in advance of program projects where soil disturbance may occur. Coordinate with the Burns Paiute Tribe on cultural resource issues. No cultural resources management plans. • Develop and implement step down cultural resource management plans for historic sites and archaeological areas • Increase monitoring, inventory, and protection of cultural resources
Opportunities for Native American Uses	Expand opportunities for Native American uses by increasing the type and quantity of species of native plants used for traditional uses
Cultural Resource Interpretation and Education	<ul style="list-style-type: none"> • Expand interpretation to improve awareness and appreciation of refuge cultural resources • Develop and implement site specific interpretive plans for Sod House Ranch, P Ranch, Benson Pond and the Double-O Ranch
Paleontological Resources	
Paleontological Resource Management and Protection	Prohibit access to sensitive areas. Continue law enforcement patrols to monitor and protect paleontological resources. No paleontological resources management plan. Develop and implement a paleontological resources management plan.
Paleontological Resource Interpretation and Education	Provide interpretation to instill appreciation for the Refuge’s paleontological resources and the valuable information they can yield about past environments.

2.5 Goals, Objectives, and Strategies

Goals and objectives are the unifying elements of successful refuge management. They identify and focus management priorities, resolve issues, and link to refuge purposes, Service policy, and the Refuge System mission.

A CCP describes management actions that help bring a refuge closer to its vision. A vision broadly reflects the refuge purposes, the Refuge System mission and goals, other statutory requirements, and larger-scale plans as appropriate. Goals then define general targets in support of the vision, followed by objectives that direct effort into incremental and measurable steps toward achieving those goals. Finally, strategies identify specific tools and actions to accomplish objectives (USFWS 2002).

In the development of this CCP, the Service also prepared an EIS. The EIS evaluates alternative sets of management actions derived from a variety of management goals, objectives, and implementation strategies.

The goals for Malheur Refuge over the next 15 years under the CCP are presented on the following pages. Each goal is followed by the objectives that pertain to that goal.

The goal order does not imply any priority in this CCP. Priorities are described in the narrative above and further developed in Appendix C.

Readers, please note the following:

- Below each objective statement are the management strategies that could be employed in order to accomplish it.
- Ranges in habitat acres capture the geographical extent of habitat types and not the quality of habitats, which is influenced by varying climatic conditions (e.g., low to high water years). Such variations do not typically cause dramatic shifts between habitats but do affect the plant communities found within the habitat types. Malheur Lake is an exception because widely fluctuating water levels do cause dramatic shifts in habitat types (i.e., salt desert scrub to lacustrine).

GOAL 1. Enhance aquatic health and habitat conditions essential to the conservation of the flora and fauna that depend on Malheur Lake and associated water bodies.

Objective 1a. Lacustrine (Malheur and Mud lakes)

Throughout the life of the CCP, enhance and maintain 500 to 110,000 acres for the health of the lake basin and associated terrestrial successional cycles of the lake systems on Malheur Refuge. American white pelican (*Pelecanus erythrorhynchos*), northern shoveler (*Anas clypeata*), canvasback (*Aythya valisineria*), and tui chub (*Gila bicolor*) will be used to evaluate habitat conditions that indicate ecosystem health for this unique marsh system. Desirable characteristics of Malheur and Mud lakes include:

- Emergent vegetation is mainly hardstem bulrush (*Scirpus acuta*), bur-reed (*Sparganium eurycarpum*), cattail (*Typha* spp.), and Baltic rush (*Juncus balticus*) and will vary in abundance depending on lake level, topography, water chemistry, wind/wave action, etc. The western portion of Malheur Lake (west of Graves Point) has the greatest opportunity to achieve hemi-marsh conditions (approximately half marsh and half open water).
- >40% cover of submergents (e.g., sago pondweed (*Stuckenia pectinata*)), associated with low turbid water conditions and maximum depth distribution in areas protected from extensive wave action.
- Russian olive (*Elaeagnus angustifolia* L.) and salt cedar (*Tamarix ramosissima*) will be absent around lakeshore or in adjacent habitats.
- Less than 100 pounds of carp per acre. This overall threshold is influenced by a multitude of factors (water quality, response of aquatic life, water depth, etc.) and may be adjusted as monitoring and inventory activities continue over time (Bajer et al. 2009).
- Provide habitat conducive to supporting viable populations of fishes such as redband trout, bridgelip suckers (*Catostomus columbianus*), and tui chubs.
- Diverse invertebrate community, including crustaceans, midges, aquatic worms, dragonflies, snails, mussels and water beetles.
- <10% cover of established noxious weed species (e.g., perennial pepperweed) per designated management area.



Strategies Applied to Achieve Objective

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

Continue to use opportunistic approaches (i.e., the use of piscicide rotenone at low lake levels) to rapidly lower carp populations.

Conduct research to understand carp population dynamics and seasonal movements.

Conduct research to understand relationships among water chemistry, lake levels, and habitat/migratory bird responses in lakes.

Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the lakes.

Investigate and implement aggressive control strategies appropriate to the Refuge, based on assessment and research findings. Control strategies could include, but not be limited to, the application of piscicide, chemo-attractants, chemo-repellants, barriers, commercial harvest, angling, and water manipulation.

Consider the need for continued amendments to and the construction of additional strategically placed in-stream structures (i.e., traps, screens, and fish wheels) that address native fish passage issues and the prohibition of carp movement through the system.

Develop partnerships to address water quality, vegetation, and carp control issues within the Harney Basin.

Enhance emergent vegetation within the lake system via carp exclosures, wind breaks, etc.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

Rationale:

Common carp were introduced into the Silvies River watershed in the early 1920s. The Silvies River has intermittent connectivity with Malheur Lake. During times of connectivity, carp and other fish species have free passage to the lake. Prior to carp infestation, a diversity of submerged and emergent vegetation was abundant. By 1952, carp activity had created such turbidity that desirable submerged aquatic plants were nearly eliminated. In 1955 the carp population was controlled with rotenone, a fish toxicant or piscicide. It is estimated that 1.5 million carp, averaging 20 to 25 inches in length, were killed. The beneficial effect was demonstrated the next year, when sago pondweed showed an immediate response to improved growing conditions and covered 15,000 acres. Intensive efforts to control carp using rotenone continued in subsequent decades and realized similarly positive, yet fleeting, responses.

Over time, however, responses to carp control became less dramatic as the lake experienced a significant reduction in emergent vegetation and a dramatic overall decrease in bird use. A combination of prolonged negative carp impacts, high water depths, and associated ice shearing during the 1980s, followed by severe drought cycles, and possible changes in water chemistry are believed to have led to the lake's dramatically declining habitat conditions. Although emergent wetlands have persisted on the southern side and isolated patches remain primarily on the western half of the lake (Bat House Island, etc.), many large areas show little to no evidence of recovery.

Bajer et al. (2009) examined changing carp densities in a recently restored 300-hectare (ha) Midwestern lake, and found that although a carp biomass of 30 kg/ha (approximately 30 lb/acre) had no discernible effects on vegetative cover (which exceeded 90%) or waterfowl (which exceeded 150,000 individuals during fall censuses), the increase in carp biomass to 100 kg/ha (100 lb/acre) was associated with a 50% decrease in both vegetative cover and waterfowl. A further increase in carp biomass to over 250 kg/ha (250 lb/acre) coincided with a decrease in the vegetative cover to 17% of the lake's surface and a decline in waterfowl use to 10% of its value when carp were absent. Overall, the increase in carp biomass could explain 93% of the variation in waterfowl abundance decline during the 4 years studied. Although the lake studied is significantly smaller than Malheur Lake, the threshold value is the only known threshold from a field study correlating carp biomass, vegetative response, and waterfowl use.

The selection of White pelican, Northern shoveler, Canvasback, and Tui chub as focal species for this goal define the mix of open water, island, hemi-marsh, and submergent plant habitat conditions essential to restoring the diversity and abundance of wildlife that historically used this area. Pelicans used open water segments for foraging and low-lying islands for breeding. Open water areas are also used by canvasbacks for loafing during migration and submergent beds such as sago pondweed for foraging. Northern shoveler depicts the interspersed open shallow water with stands of submergent and emergent vegetation for foraging as well as associated grasslands and rangelands for nesting needed by a variety of wildlife species. This same general habitat type is used by Tui chub for spawning and foraging with a heavier vegetation component. The chub is an essential foodbase for waterbirds, one of the primary guilds of birds intended to be preserved in the lake's acquisition.

It is not known at this time if historic levels of hemi-marsh and submergent plant communities can be attained if carp control thresholds are successfully reached and maintained. Through the life of this CCP, a comprehensive, science-based approach to carp control will be initiated to reduce the carp population to the targeted threshold of 100 pounds of carp per acre. Lake rehabilitation efforts will involve the assessment of current water quality and habitat conditions, site potential, and vegetative trends, and these efforts will seek to increase our understanding of common carp's biotic potential, carrying capacity, density-dependent factors, distribution, and susceptibilities within the lake and connected aquatic systems. The understanding gained through these efforts will assist refuge staff and partners in increasing the productivity of Malheur Lake, once a significant resource in the Pacific Flyway. Increased partnerships with subject-matter experts and funding agencies will be the key to this effort's success.

GOAL 2. Monitor, protect, maintain, and/or rehabilitate riverine habitats to conditions essential for the conservation of native fish and wildlife species.

Objective 2a. Riverine (rivers and associated tributaries terminating on the Refuge): Develop an Integrated Wetland/River Rehabilitation Plan and Associated NEPA Document with Partners

Throughout the life of the CCP, necessary information will be gathered to develop a comprehensive rehabilitation plan for targeted river systems² and floodplain habitats. Information concerning biological, physical, and management attributes of these habitats will be gathered through specific assessments, pilot projects, and modeling (see Objectives 13b and 13c). This information will contribute to developing a decision support system that will allow comparisons among various alternatives in achieving management objectives and establish tools necessary to support development of a comprehensive riverine/wetland rehabilitation plan.



Pending the above approach for gaining understanding of pertinent riverine systems, desirable characteristics of riverine habitats for redband trout, other fish species, and native wildlife within the Refuge include:

- Water quality (e.g., maximum water temperature of <20°C, dissolved oxygen, turbidity, etc. within Oregon standards or exhibit no additional degradation attributable to refuge management actions)
- Native fish habitat (i.e., redband trout): stream shading (>80%); bank cover (no bare soil); bank stability (<5% eroding); channel stability (<1% channel movement); fine sediment <2 mm (<10%); cover (>50% of channel [Zoellick and Cade 2006]); percent late summer pools (25%-75%); and mean annual base flow (>45% of annual flow) (Raleigh et al. 1984)
- Connectivity among habitats (i.e., unimpeded passage within channels, floodplain regularly flooded, continuous site-appropriate vegetation along riparian zones)
- Channel form and substrate composition consistent with geomorphic and hydrologic setting

Strategies Applied to Achieve Objective

Initiate process necessary to complete wetland/riverine strategic plan and associated NEPA documentation.

Rationale:

Using information and research gleaned from assessments and pilot projects (see Objectives 13b and 13c), an integrated wetland/riverine strategic plan will be pursued to consider if rehabilitation is needed and various alternatives for river restoration; weigh the biological, cultural, economic, and social benefits and costs; and determine a future course of action supporting desired ecological outcomes. A three-tiered process will be required to develop the management plan: (1) identification of management objectives and assessment of hydrologic, geomorphic, and biologic features associated with target riverine systems (e.g., Blitzen River) and associated wetlands; (2) implementation of riverine pilot projects to evaluate biological and physical responses to management action and assess management objectives; and (3) development of a decision support system to support an integrated wetland/river rehabilitation plan and associated NEPA process (and resulting documentation) with partners.

² Refuge riverine systems include the Blitzen, Silver Creek, and Silvies watersheds.

Redband trout is designated as the focal species for riverine habitat. Redband need a stable free-flowing stream with a mix of channels, riffles, and pools as well as shading along various river reaches to support the year-round requirements of this species as well as a variety of other native fish and wildlife. This will provide the cornerstone for the three-tiered assessment process used in development of a wetland/river rehabilitation plan.

The management direction was formulated to emphasize carp control while moving forward strategically with the riverine strategy. It follows a three-tiered process leading toward a strategic plan but allows for flexibility in the amount of progress that is made depending on the availability of resources and success related to carp control on the Refuge. It offers the advantage of using other available resources if they become available through agency funding, and partnerships. Another advantage of the management direction is that a greater understanding of the impacts on adjacent floodplain habitats will be gained over a longer study period, enabling the development of site-specific knowledge of how riverine, wet meadow, and marsh communities would respond to hydrologic system changes. The management direction will use a science-based process to inform decisions regarding the river to determine existing biological conditions and site capability. The Refuge will work with the Ecology Work Group and other stakeholders within the first 5 years of the CCP to prioritize and refine a set of priority questions/objectives (see Objectives 13b and 13c), creating a foundation to construct a comprehensive riverine strategy. Based on these questions/objectives the Refuge will take advantage of new resource opportunities to implement appropriate science-based steps to continue the advancement of a comprehensive river strategy.

Objective 2b. Riverine

Throughout the life of the CCP, enhance and maintain the aquatic health of the riverine systems of Malheur Refuge for the benefit of redband trout and other priority resource species by doing inventory and monitoring of biotic and abiotic factors and conducting research pertaining to carp control.

Desired characteristics of Riverine include:

- Native and localized fish populations thriving and invasive carp population controlled
- Screened diversions and effluents pertaining to the river water delivery system
- Diverse invertebrate community, including crustaceans, midges, aquatic worms, dragonflies, snails, mussels and water beetles.

Strategies Applied to Achieve Objective

Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.

Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.

Conduct research to understand carp population dynamics and seasonal movements.

Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.

Rationale:

Yellow warblers, willow flycatchers, and associated benefitting species require dense thickets of deciduous riparian shrubs dominated by various willow species and occasionally interspersed with other shrubs and hardwood trees for feeding, reproduction, and migration. With these species almost entirely restricted to river corridors in this arid region the condition of this habitat is vitally important.

The riverine system of the Malheur Refuge is an integral part of the success or failure of many habitat types. For the life of this CCP, the focus will be on collecting data of biotic and abiotic parameters and finding ways to control carp. The recent addition of fish passage ladders, traps, and screens on the

Blitzen River have decreased thousand of acres that were available for spawning and juvenile rearing of common carp. In addition, this has decreased the number of redband trout and other species from entrainment in the irrigation system. The Silvies and Silver River health will be pursued by collaborating with landowners and other partners to focus on carp control.

GOAL 3. Protect, maintain, and rehabilitate riparian habitats to conditions essential for the conservation of wildlife species.

Objective 3a. Woody Riparian

Throughout the life of the CCP, enhance and maintain 1,000 to 1,500 acres of riparian shrub habitat on Malheur Refuge for the benefit of migratory land birds (e.g., yellow warbler (*Dendroica petechia*), willow flycatcher (*Empidonax traillii*)) and other wildlife. Desired characteristics of riparian shrub include:



- 40%-80% canopy cover of native shrub species (e.g., coyote willow (*Salix exigua* Nutt.), hawthorn (*Crataegus* L.), redosier dogwood (*Cornus sericea* L.), goose berry (*Ribes hirtellum*), Wood’s rose (*Rosa woodsii*)) that are >3 feet tall in areas associated with flood irrigation or shallow water table
- >10% cover of understory native herbaceous species (e.g., sedges, rushes, spike bentgrass (*Agrostis exarata*), cinquefoil (*Potentilla* L.), false lupine (*Thermopsis villosa*))<5% cover of reed canarygrass and noxious species

Strategies Applied to Achieve Objective

- Improve native plant cover and distribution by active planting or seeding appropriate native species.
- Exclude livestock from riparian habitats adjacent to meadow areas receiving grazing treatments (e.g., temporary or permanent fencing).
- Promote riparian shrub health (e.g., prescribed fire and mechanical removals to stimulate new growth and suckering), especially in decadent stands.
- Permanently exclude grazing from streamside corridors (Appendix K).
- Manipulate soil moisture in riparian areas outside of the naturally occurring floodplain (e.g., flood irrigation associated with meadow management).
- Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

Rationale:

Yellow warblers, willow flycatchers, and associated benefitting species require dense thickets of deciduous riparian shrubs for feeding and/or reproduction. This objective and associated strategies seek to maximize shrub density while managing for periodic disturbance to reinvigorate woody riparian stands. The greatest negative impact to riparian shrub habitat over the last century has been past grazing practices and the purposeful eradication of riparian habitats throughout the Blitzen Valley. In recent years, livestock grazing and other impacts to woody riparian communities have been significantly reduced. The result has been an increase in both the quantity and quality of this habitat type on the Refuge. In order to continue this upward trend, it will be necessary to protect these and additional potential woody riparian areas from unnecessary impacts. In target areas that are either disconnected from the floodplain, or lie outside of floodplain areas, supplemental soil moisture via

flood irrigation will be used to sustain existing acres of this habitat and promote its expansion. Strategic planting will be used to increase shrub species diversity, particularly along waterways, and may include native shrubs such as various willows (e.g., beak, Drummond’s, Geyer, Lemmon’s Pacific, and yellow), black hawthorn, chokecherry, golden currant, Lewis’ mock orange, redosier dogwood, Saskatoon serviceberry, silver buffaloberry, and water birch. Prescribed fire and mowing treatments will be infrequent and balanced by the need for older stands of dense, undisturbed willow/shrub areas according to focal species needs and designated acreages.

The vast majority of this habitat is located in the southern Blitzen Valley and extends northward along the Blitzen River and associated waterways and adjacent to impoundments. This habitat is not prolific in the Double-O Unit due to prevailing soil conditions (i.e., alkalinity) and only occurs there in isolated areas.

GOAL 4. Enhance, protect, and/or maintain primary habitats essential to the conservation of a diversity of aquatic and terrestrial wildlife species.

Objective 4a. Palustrine Emergent (seasonally flooded wet meadow)

Throughout the life of the CCP, enhance and maintain 22,000 to 27,000 acres of moist/wet meadow habitat on Malheur Refuge for the benefit of migratory birds (e.g., bobolink (*Dolichonyx oryzivorus*), sandhill crane, cinnamon teal (*Anas cyanoptera*)), and a diverse assemblage of other wildlife (e.g., Columbia spotted frog (*Rana luteiventris*)). Desired characteristics of moist/wet meadow habitat include:



- Irrigation depths ranging from 0 inches (subirrigation) to 5 inches of standing water
- >75% cover of perennial grasses, rushes, and sedges
- 15%-20% cover of forbs such as lupine, clover, and cinquefoils
- <20% cover of reed canarygrass
- <5% cover of noxious weeds (e.g., perennial pepperweed and Canada thistle)
- Grass height of treated acres <6 inches by October 1
- Maintain site vigor (i.e., prevent excessive litter accumulation from hindering diversity and expression of plant species)
- >50% of stems in a vertical or semivertical position for nesting waterfowl and other wildlife
- No willows
- Intake and effluent water screened or manipulated to stop influx of carp during spawning and juvenile rearing

Strategies Applied to Achieve Objective

Maintain/enhance management units within this habitat type through the use of prescribed fire, haying, rake-bunch grazing, and rest from defoliation.

Maintain/enhance management units within this habitat type through the use of active successional vegetation management (e.g., seeding, disking, grazing, grain farming, etc.).

Use tolerance thresholds specific to each plant community as determined through the Malheur Refuge State-and-Transition Model (Appendix L) to influence management prescriptions to meet annual and long-term wet meadow habitat objectives.

Use both winter and summer water rights in flood irrigation. Commencement and duration will depend

on site-specific objectives.
Modify dikes, ditches, and other infrastructure as needed to reclaim acres lost to cattail encroachment (e.g., Northwest Big Sagebrush field).
Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).
Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.
Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.
Conduct research to understand carp population dynamics and seasonal movements.
Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.
Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.
Enhance water control structures to stop the influx of spawning carp and juvenile rearing.
<p>Rationale:</p> <p>Cinnamon teal, greater sandhill crane, and bobolink have been designated as focal species for palustrine emergent seasonally flooded wet meadows. Cinnamon teal nest near water in rushes, sedges, and grasses or occasionally over water in dense bulrush and cattails and move to nearby large wetlands for molting and brood development. The sandhill crane nests in isolated emergent vegetation within expanses of wet marshy meadows and forage in these same locations. The bobolink uses irrigated lowland wet meadows within the refuge landscape. They prefer transitional areas between wetter and drier sites dominated by dense stands of vegetation with a high percentage grass and moderate percentage of forbs and good litter density.</p> <p>The Refuge provides much needed wetland habitat within the Pacific Flyway. Refuge wetlands have long been managed under prescriptions necessary to meet the needs of migrating and reproducing waterbirds and waterfowl. Unfortunately, these same prescriptions can cause undesirable plant community transitions. This dilemma creates a need for a creative and flexible new management paradigm. For example, warm-season cattail treatments may need to take place in areas experiencing encroachment of meadows by cattail (e.g., the lower Buena Vista Unit). Although extended irrigation schedules encourage this problem in some areas, they also play a significant role in meeting critical needs during various stages of wildlife reproduction and development. Therefore, the cessation of such a practice may not be desirable.</p> <p>The CCP will begin with a 60:40 ratio of treated to untreated meadow, which was arrived at by examining past and current management practices (Blitzen Valley and Double-O Management Plans), consulting with former refuge biologists and flyway experts, and carefully examining life stage requirements for various wildlife species that use this habitat throughout the year (see Appendix K). It represents a starting point to test the efficacy of the haying and grazing program to achieve wet meadow objectives. This ratio is relevant only when considering all wet meadows within the Refuge and differs across fields and area-specific management units. The needs of focal species, the suite of wildlife they represent, and the nature of habitats they depend on determines the use and extent of these tools in realizing or maintaining attributes identified under this objective. This ratio provides an understanding of the overall use of haying and grazing but does not address the specific needs of wildlife in specific areas. These tools will be carefully evaluated on an annual basis by the science advisory team and adjusted relative to their efficacy in terms of achieving refuge objectives. The 60:40 ratio is meant to be illustrative, not definitive. Key to this approach is a recognition that haying and grazing is a tool to achieve desired habitat conditions as opposed to an objective unto itself. To ensure long-term habitat integrity of at-risk wet meadows, a combination of irrigation schedule adjustments,</p>

the designation of alternative suitable acres to meet irrigation prescriptions, or warm-season treatments may be used. Associated changes in water management that make these areas less susceptible to cattail expansion will be sought if alternative suitable acres are available to meet irrigation prescriptions. Treatments may include the use of livestock on reed canarygrass monocultures or the use of a marsh master (i.e., mowing), aerial application of appropriate pesticide, among other methods to set back cattail stands.

Mesic wet meadow areas may be placed on a rest-rotation schedule and forego defoliating treatment for periods suitable to site-specific conditions and associated wildlife habitat objectives (>50% vertical stems, etc.). Although most dense vegetative nesting is encouraged in marsh or dry meadow/sagebrush lowland/salt desert scrub sites, wet meadow areas less prone to flooding after the initiation of nesting activities can provide valuable breeding habitat for a variety of avian species.

In many refuge management units, topographic heterogeneity plays a significant role in providing for the habitat needs of a diversity of wildlife species. Variations in depth to water table allow for a variety of plant assemblages to be expressed across the landscape. Extra care is needed in areas where gradients in elevation occur with less frequency. In the former situation, prolonged irrigation may meet nesting and foraging needs of waterfowl and cranes without crossing thresholds that lead to significant decreases in forb and grass species and susceptibility to cattail and reed canarygrass invasion. In the latter situation, irrigation can strongly influence the long-term viability of the site for wildlife use.

In many areas, topographic diversity has been greatly reduced by past farming practices involving disking, plowing, and other ground-leveling disturbances. This is why it is important to remain cognizant of hydrological gradients that can drive plant community expression and subsequent habitat quality and availability for a number of target wildlife species. Sandhill cranes and bobolinks were both selected as focal species for this habitat type because they tend to prefer conditions on opposite ends of the moist-to-wet meadow gradient that exists for this habitat type. It is important to establish irrigation prescriptions that accommodate the habitat needs of both species. By carefully identifying priority areas for both focal species and regarding the larger plant successional characteristics that are involved in meadow management to meet prescriptions long-term, dynamic management will seek to maintain or enhance the integrity of this habitat type in areas where dynamic, yet subtle shifts in topography have been compromised or an unacceptable percentage of plant assemblages is shifting toward undesirable species such as reed canarygrass or hybrid/common cattail.

Treatments may be applied during the growing or dormant season, depending on a science-based rationale. Due consideration will be given for late nesting requirements. Grazing may take the form of rake-bunching for litter management and to provide for migrants and early arriving wildlife. The use of livestock may be prescribed during the growing season in designated areas to influence plant community succession (see Appendix K).

Grain farming may be used as a tool to facilitate a significant successional shift toward more desirable plant communities. This approach is appropriate when conditions merit the manipulation of the existing soil propagule bank (e.g., seeds, tubers, rhizomes). The intensive annual management needed for grain production can drive undesirable plant species from the treatment area and allow a transition to more favorable species. Under this type of strategy, the cessation of farming will coincide with assisted/controlled colonization of desirable species.

Enhancement of water control structures on the intake and outflow of this habitat is an integral way to control spawning and rearing of juvenile common carp. By installing/maintaining fish screens or modifying the current water control structures the acres inhabited by carp will sharply decrease and the food source for birds will increase.

Objective 4b. Palustrine Emergent (seasonally flooded marsh associated with wet meadow)

Throughout the life of the CCP, enhance and/or maintain 15,000 to 16,000 acres of emergent marsh on Malheur Refuge (excluding marshes associated with Malheur Lake) for the benefit of migratory birds (e.g., yellow-headed blackbird, sandhill crane, redhead, bittern, mallard) and a diverse assemblage of

other wetland-dependent wildlife (beaver, muskrat, native amphibians, and reptiles). Emergent marsh generally occurs within a mosaic of moist/wet meadows. Desired characteristics of emergent marsh within this habitat complex include:

- Dominated by emergents (favoring hardstem bulrush and burreed while de-emphasizing cattails)
- Water depths ranging from 6 inches to 3 feet
- Irrigated in concert with associated wet meadows. Typically flooded by mid-March for breeding/nesting migratory birds and inundated until at least July 1
- 20%-40% open water for foraging wetland birds in areas of continuous marsh >10 acres in size
- Open water areas host submergents (e.g., sago pondweed)
- No carp or Eurasian water milfoil (*Myriophyllum spicatum* L.)
- Intake and effluent water screened or manipulated to stop influx of carp during spawning and juvenile rearing
- <20% cover invasive plants (e.g., reed canarygrass, common reed (*phragmites* spp., hybrid cattail)
- Diverse invertebrate community, including crustaceans, midges, aquatic worms, dragonflies, snails, mussels, and water beetles.



Strategies Applied to Achieve Objective

- Reduce extensive emergent cover using prescribed fire, disking, herbicides, and mowing.
- Facilitate treatment of extensive emergents and/or carp control using periodic drawdowns.
- Ensure water delivery and management through maintenance or enhancement of infrastructure (e.g., delivery ditches, water control structure).
- Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).
- Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.
- Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.
- Conduct research to understand carp population dynamics and seasonal movements.
- Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.
- Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.
- Enhance water control structures to stop the influx of spawning carp and juvenile rearing.

Rationale:

Palustrine emergent seasonally flooded marsh associated with wet meadow is usually found immediately adjacent to our irrigated meadow system. Sandhill crane and yellow-headed blackbird, focal species for this habitat, require nesting sites over or near water in dense emergent stands of cattail, bulrush, or reeds, which predominate on these sites. They forage on the abundance of insects, macro-invertebrates, and other small wildlife species found in this environment during brood rearing. The adjacent meadows are used later in the year for summer foraging and staging for the fall migration. This blend of habits is central to the success of these birds and other associated wildlife species. Managing toward 20%-40% open water in emergent stands associated with wet meadows provides optimum conditions for the greatest diversity of dependent species. Diverging from this range in either

direction decreases overall wildlife diversity and abundance; however, it may not be practical to meet this prescription for every acre across this habitat type due to its quantity and the limited availability of resources. Priority will be given to areas directly adjacent to the most productive wet meadows. Seasonal marshes should be irrigated simultaneously with wet meadows since the two are generally connected hydrologically, as well as biologically in terms of wildlife use.

The above-mentioned strategies (mowing, grazing, burning, deep flooding, prescribed drought, plowing, herbicides, etc.) can generally reduce the density of emergent vegetation in direct relation to the intensity of the treatment. The plant species composition of specific target areas will determine appropriate management actions because some species are preferred over others (e.g., bulrush at the expense of cattail), and species such as burreed are more sensitive to disturbance than others.

The reduction of approximately 2,000 acres in this habitat type coincides with an equivalent increase in semiflooded seasonal wet meadows. This projected shift will not lead to a decrease in quality marsh habitat because the specified acreages address areas of meadow that have been invaded by cattail species.

Enhancement of water control structures on the intake and outflow of this habitat is an integral way to control spawning and rearing of juvenile common carp. By installing/maintaining fish screens or modifying the current water control structures the acres inhabited by carp will sharply decrease and the food source for birds will increase.

Objective 4c. Palustrine Open Water/Emergent (semipermanently flooded wetland impoundment)

Throughout the life of the CCP, protect and maintain 2,200 to 2,800 acres of semipermanently flooded wetland impoundments on Malheur Refuge for the benefit of migratory birds (e.g., trumpeter swans, sandhill crane, redheads, mallards, soras, Virginia rails, colonial waterbirds) and other wetland-dependent species (beaver, muskrat, native amphibians and reptiles). The desired characteristics sought for this habitat type include:



- Between 40:60 and 60:40 ratio of open water to emergent plant cover in individual units (with the exception of Boca Lake, which will be managed for <20% emergent marsh cover, and West Knox Pond, which will be managed primarily as a moist soil unit)
- Emergent species include bulrush (predominantly hardstem), burreed, and cattail (predominantly common)
- Water depths ranging from 6 inches to 3 feet
- Permanently flooded with drawdowns every three to seven years (with the exception of West Knox Pond, which will be managed primarily as a seasonal wetland [i.e., moist soil unit] and Boca Lake, where water levels will fluctuate more frequently to meet annual seed production goals and carp control)
- >40% cover of submergents (e.g., sago pondweed) within open water
- No carp or Eurasian water milfoil (*Myriophyllum spicatum* L.)
- <10% cover invasive plants (e.g., reed canarygrass, phragmites, hybrid cattail)
- Diverse invertebrate community, including crustaceans, midges, aquatic worms, dragonflies, snails, mussels and water beetles.

Strategies Applied to Achieve Objective

Deliver and manage water through maintenance or enhancement of infrastructure (e.g., delivery ditches, water control structure). Address needs associated with spotted frog refugia in identified areas (e.g., East Canal, Five Mile Spring within West Canal, etc.).

Use prescribed fire to remove extensive emergent cover.
Use disking to remove extensive emergent cover.
Use mowing to remove extensive emergent cover.
Apply herbicide(s) to control emergents.
Experiment with grazing as a tool in monotypic stands of emergent cover to set back succession.
Manage water levels by flooding up and drawing down for habitat and carp management.
Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).
Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.
Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.
Conduct research to understand carp population dynamics and seasonal movements.
Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.
Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.
Enhance water control structures to stop the influx of spawning carp and juvenile rearing.
<p>Rationale:</p> <p>Palustrine open water/emergent (semi-permanently flooded wetland impoundments) are vital to migratory waterfowl and other water birds. The focal species eared grebe, redhead, and ruddy duck express the range of habitat requirements used by the wide diversity of wildlife species benefiting from this habitat. All three prefer large permanently or semi-permanently wetlands or impoundments where open water areas are interspersed with emergent and submergent vegetation tracts. Water depth is the critical factor separating how our focal species and other associated wildlife species use the habitat. The eared grebe favor abundant submergent aquatic beds linked to open water areas up to 10 feet deep to nest and forage in. The ruddy duck prefers interspersed open water and vegetation areas from 1 to 3 feet deep while redheads can be found in the same environments with water depths from a few inches to 3 feet. It should be remembered that these wetlands are critical brooding and rearing areas for the very large portion of the diversity of birds using the refuge.</p> <p>This wetland habitat will be managed for moist soil vegetation or to provide optimum food production in the form of submergent aquatic plants and aquatic invertebrates. For shorebirds, shallow water drawdowns will provide important feeding opportunities. Emergent vegetation in marshes provides nesting cover for overwater nesters (e.g., sandhill crane, trumpeter swan, rail, redhead, bittern, canvasback, mallard, and diving ducks) and escape cover for broods of numerous species, particularly late-season nesters such as gadwall, redhead, and grebes.</p> <p>Periodic drawdowns and deep flooding are important tools in management of pond vegetation. A gradation of water depths from mud flats to deep water pools will encourage use by a wide variety of wildlife.</p> <p>Enhancement of water control structures on the intake and outflow of this habitat is an integral way to control spawning and rearing of juvenile common carp. By installing/maintaining fish screens or modifying the current water control structures the acres inhabited by carp will sharply decrease and the food source for birds will increase.</p>

Objective 4d. Dry Meadow

Throughout the life of the CCP, enhance or maintain 4,500 to 5,000 acres of dry meadows on Malheur Refuge for the benefit of nesting migratory birds (e.g., cinnamon teal, northern pintail, savannah sparrow) and a diverse assemblage of other species (e.g., small mammals). The desired characteristics of dry meadow habitat include:



- 50%-70% cover of live native grasses (e.g., creeping wildrye)
- At least 20% cover of plant litter (residual)
- <10% cover of invasive plants (e.g., Russian knapweed (*Acroptilon repens*), pepperweed, whitetop (*Cardaria* spp.))
- Disturbance regime on five- to 10-year intervals to rejuvenate nesting cover (see Appendix B, Grazing and Haying Compatibility Determination, for potential uses)

Strategies Applied to Achieve Objective

Use agricultural practices (e.g., haying, grazing) to maintain/enhance fields to meet the habitat objective. Treatments may be applied during the growing season or dormancy, depending on a science-based rationale.

Use burning regimes where feasible.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

Rationale:

Western meadowlark is the focal species for this habitat and its habitat requirements provide many of the key needs for the diversity of other wildlife using this environment. Meadowlark favor open country meadows, fields, or desert grasslands with good grass and litter cover with little or no woody layer.

Manipulation of vegetation via mowing, burning, or grazing will be used to stimulate vertical nesting structure (Cornely et al. 1983) and deter successional shifts away from desirable conditions (i.e., shrub encroachment could be controlled through the use of prescribed fire). Prescribed fire is the preferred tool for stimulating this habitat type because it is also the most effective tool for controlling sagebrush encroachment from adjacent upland habitats and has the highest potential for stimulating a favorable forb response. If perennial pepperweed and/or other noxious species pose a threat to areas needing treatment, then mowing will be the preferred tool. Mechanical treatments can be advantageous on weed-prone sites because the amount of resources (e.g., nutrients) released by this management action is less than that released by prescribed fire. If mowing is not feasible due to the presence of rocks, shrub stumps, or other obstacles, then late-season grazing may be implemented.

Warm-season grazing or other manipulations as directed by the Malheur Refuge State-and-Transition Model (see Appendix L) and associated collaborative process may be merited in specific situations where target plant community characteristics are at risk or are no longer present (e.g., increasing dominance of Russian knapweed).

When desirable characteristics for this habitat type are achieved, site productivity and plant species composition will determine the frequency and specific type of disturbance on a field-by-field basis. Treatments should be infrequent because many avian species prefer to nest in dry meadows consisting of dense residual vegetation.

Objective 4e. Salt Desert Scrub

Throughout the life of the CCP, protect and maintain 40,000 acres of salt desert scrub for the benefit of breeding migratory birds (e.g., sage thrasher, sage sparrow) and other native wildlife species (e.g., kangaroo rats (*Sorex preblei*), grasshopper mouse (*Onychomys leucogaster*)) on Malheur Refuge. The desired characteristics of desert salt scrub and greasewood habitat include:



- <15% cover of scattered patches of shrubs (e.g., greasewood)
- <20% cover of native herbaceous species
- >20% cover bare ground
- Microbiotic crust present
- <10% cover of invasive plants
- Minimal human disturbance

Strategies Applied to Achieve Objective

Protect existing sensitive sites with microbiotic crusts.

Use prescribed fire depending on site-specific factors.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

Rationale:

Aside from periodic weed control and prescribed fire, this habitat type does not receive a significant amount of active management.

The habitat preferences of loggerhead shrike of open terrain with low density of shrubs mixed with low or sparse grasses characterize the needs of other wildlife species typically found in the settings.

Objective 4f. Sagebrush Lowland

Throughout the life of the CCP, protect and maintain 4,300 to 4,500 acres of lowland big sagebrush habitats (e.g., basin big sagebrush, Wyoming big sagebrush, basin wildrye, Indian ricegrass, Sandberg’s bluegrass, bottlebrush squirreltail, etc.) for the benefit of ground nesting migratory birds (e.g., gadwall, short-eared owl, meadowlark) and a diverse assemblage of native species (e.g., small mammals). At any time, 40% of the sagebrush lowland habitat on the Refuge is characterized by the following attributes:



- 0%-12% canopy cover of dominant and subdominant brush species (e.g., basin big sagebrush, Wyoming big sagebrush, greasewood, rabbit brush, horse brush)
- 10%-25% cover of native bunchgrasses (e.g., great basin wildrye, Sandberg’s bluegrass, etc.) and forbs
- >5% cover of residual bunchgrasses
- <10% cover invasive plants (e.g., pepperweed, knapweeds)

Strategies Applied to Achieve Objective

Use prescribed fire.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to

control/eradicate invasive plants (see Appendix G).

Rationale:

Mallard and gadwall are focal species for sagebrush lowland and in this region prefer islands of brushy shrubland mixed with clumps of native bunchgrasses in the vicinity of water.

Aside from periodic weed control and prescribed fire, this habitat type does not require a significant amount of active management.

Objective 4g. Sagebrush Steppe

Throughout the life of the CCP, protect and maintain 15,500 acres of sagebrush steppe upland habitat on Malheur Refuge for the benefit of migratory landbirds (e.g., sage sparrow, brewer sparrow, sage thrasher) and a diverse assemblage of other sagebrush-obligate species (e.g., jackrabbit, mule deer). Desired characteristics of sagebrush steppe habitat to achieve include:



- 0%-20% canopy cover of sagebrush species (e.g., Wyoming sagebrush, rabbit brush, bitterbrush)
- >5% cover of bunchgrasses (e.g., Idaho, fescue, Sandberg’s bluegrass, bluebunch wheatgrass)
- 3%-5% cover of native forbs (e.g., western yarrow, arrowleaf balsam root, lupine)
- No medusahead or young juniper present
- 5% cover of cheatgrass
- <5% cover of other invasive plants

Strategies Applied to Achieve Objective

Add diversity to crested wheatgrass monocultures using best science practices (i.e., Krumbo research project).

Mimic natural disturbance process in sagebrush communities using mechanical and chemical methods to promote bunchgrasses and forbs.

Seed desirable grasses and forbs.

Use prescribed fire, where appropriate, and based upon site-specific conditions.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

Rationale:

Wildlife use in this sagebrush landscape is dominated by rangeland passerine birds with the sage thrasher designated as the focal species. The thrasher favors large contiguous tracts of open terrain covered with high density of shrubs with a scattered herbaceous layer. These habitat elements also support a number of mammals such as the pronghorn antelope as well as other wildlife species.

Aside from periodic weed control and limited prescribed disturbance, this habitat type does not require a significant amount of active management. Research is currently being conducted on the Refuge to address the lack of species diversity in areas that were historically seeded into crested wheatgrass following wildfire. Depending on research results, some successional management may occur on these sites, but wetland habitat management will continue to receive highest management priority.

Objective 4h. Dune	
<p>Throughout the life of the CCP, protect and maintain 6,300 acres of dune habitat on Malheur Refuge. Desired characteristics of dune habitats include:</p> <ul style="list-style-type: none"> • Open sand dunes hosting widely spaced shrubs (e.g., shortspine horsebrush, fourwing saltbush, bud sagebrush, green and gray rabbitbrush, greasewood, and Basin big sagebrush), grasses (e.g., Indian ricegrass, needle-and-thread, bottlebrush squirreltail, alkali sacaton), and forbs (e.g., tufted evening primrose, Paiute suncup, Geyer’s milkvetch, sharpleaf penstemon, various lupines) • Soil formation by lacustrine sands is neutral to moderately alkaline (8.2); moist in the winter and spring and usually dry June through October • Host rare and unique invertebrates 	
Strategies Applied to Achieve Objective	
Protect dune areas from disturbance (e.g., well-maintained boundary fences).	
Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).	
<p>Rationale:</p> <p>The sage sparrow has been defined as the focal species for this environment. The habitat needs of this bird as well as associated wildlife species readily describe the landscape. It prefers tracts of widely spaced shrubs surrounded with open patches of bare soil or sand and lightly scattered grasses and forbs. Aside from periodic weed control, this habitat type does not require a significant amount of active management.</p>	

Objective 4i. Playa	
<p>Throughout the life of the CCP, protect and maintain 29,000 acres of playa on Malheur Refuge for the benefit of migratory birds (e.g., snowy plover) and associated guilds. The desired characteristics of playa habitats include:</p> <ul style="list-style-type: none"> • Retention of hypersaline conditions where appropriate (avoid dilution caused by freshwater irrigation) • Water depth ranges from hydrated soils to 3-4 feet • Bare ground with little vegetation (e.g., saltgrass, shrub, herbaceous cover) • Recharge through springs or natural overland flow • High populations of brine flies and brine shrimp • Retention of fringe habitats consisting of dunes, salt desert scrub, and mudflat habitats • No salt cedar present 	
Strategies Applied to Achieve Objective	
Prevent freshwater irrigation from negatively impacting water chemistry.	
Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).	
<p>Rationale:</p> <p>This unique environment is well defined by the habitat needs of its focal species, the snowy plover.</p>	

This bird favors barren, sparsely vegetated alkaline flats usually with an adjacent very shallow gloss of water within a mile.
 Aside from periodic weed control around perimeters, this habitat type does not require a significant amount of active management.

Objective 4j. Provide Agricultural Crops for Migratory Waterfowl and Sandhill Cranes

Throughout the life of the CCP, annually provide approximately 80 to 1,000 acres of small grains (e.g., wheat, barley) as forage for migrating aquatic birds (e.g., waterfowl, sandhill crane) and other resident wildlife. The desired characteristics of agricultural lands cropped in small grains include:

- Fall harvesting completed by October
- ≤1,000 acres as short-stature small grains available during mid-fall to mid-winter
- Limited presence of invasive plants

Strategies Applied to Achieve Objective

Use traditional agricultural practices (cultivating, seeding, fertilizing) to produce grain crops.

Conduct cropland management through cooperative farming agreement and/or refuge staff.

Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).

Rationale:

Grain farming in the Blitzen Valley is essential to meeting Refuge objectives for fall maintenance of greater sandhill cranes. Grain crops on the Refuge and adjacent private lands provide for a large population of staging and migrating cranes in fall, and are recommended under the Greater Sandhill Crane (Central Valley Population) Pacific Flyway Plan (Pacific Flyway Council 1997). Analysis has determined that 190 tons of grain is required to meet 225,000 crane use-days (Rule et al. 1990). This is the target number of crane use-days, based on historical crane use on the Refuge. The average yield per acre in the Blitzen Valley is 1 ton per acre. Currently the acres farmed on the Refuge have the potential to meet about half this target, but the force-account (Refuge staff conducts farming) method of grain production results in the grain availability being less consistent. In addition, there is no guarantee that the adjacent private lands will continue to be farmed in the future.

Under the CCP, the Service attempts to resolve these issues by doubling the target level of grain produced on Refuge lands, and by modifying the program to a cooperative farming model. Under this model, Refuge lands are used for growing crops but the labor is provided by a private farmer. The farmer will be compensated for his/her efforts by being permitted to take an 80% share of the crop. The remaining 20% will be left in the field for wildlife. Although such a model will provide more consistency in the grain production for the benefit of cranes, it also requires a larger land base for crop production. Under this scenario, approximately 950 acres of grain farming will be needed.

GOAL 5. Enhance and maintain rare and unique habitats.

Objective 5a. Cold and Hot Springs

Throughout the life of the CCP, protect and maintain 230 to 250 acres of cold and hot springs, associated pools, and vegetative habitats on Malheur Refuge for the benefit of a diverse assemblage of native plants, fish, and wildlife species (e.g., Columbia spotted frog, endemic invertebrates).

<p>The desired characteristics of cold and hot springs include:</p> <ul style="list-style-type: none"> • Water table and springhead integrity maintained • Diversity of native macroinvertebrates • Breeding, feeding, and winter refugia for native amphibians • Dominant substrate vegetation, with boulders, fines, cobble, or gravel • Vegetation varies depending upon soil type • No turbidity • No carp or bullfrogs present 	
<p>Strategies Applied to Achieve Objective</p>	
<p>Secure/adjudicate groundwater rights to protect cold and hot springs.</p>	
<p>Protect spring habitat to provide a stable permanent water source for Columbian spotted frogs.</p>	
<p>Protect spring habitat areas from undesirable, preventable disturbance (i.e., livestock grazing, traffic, etc.).</p>	
<p>Use IPM strategies including chemical, mechanical, horticultural, and biological control agents to control/eradicate invasive plants (see Appendix G).</p>	
<p>Conduct baseline inventories of fish, wildlife, and vegetation to guide future management actions.</p>	
<p>Conduct surveys, inventories, and assessments of pre- and post-carp control effects on aquatic habitats.</p>	
<p>Conduct research to understand carp population dynamics and seasonal movements.</p>	
<p>Conduct research to understand relationships among water chemistry, water levels, and habitat/migratory bird responses in this habitat type.</p>	
<p>Develop a model to predict habitat response based upon changes in biotic and abiotic factors in the habitat type.</p>	
<p>Rationale: Springs provide a stable, permanent source of water for spotted frog breeding, feeding, and winter refugia. Current refuge distribution of the spotted frog is believed to be associated with spring-fed water bodies. Invasive species in these habitats may compete for habitat and food, carry diseases, or be predators upon these amphibians.</p>	

<p>Objective 5b. Cliffs, Rimrock, and Lava Flows</p>	
<p>Throughout the life of the CCP, protect and annually maintain cliff, rimrock, and lava flow habitats for the benefit of migratory birds (e.g., golden eagle, prairie falcon) and a diverse assemblage of native, cliff/canyon-dependent wildlife (e.g., bat species, marmot) on Malheur Refuge. The desired characteristics of cliffs, rimrock, and lava flow habitats include:</p> <ul style="list-style-type: none"> • Well-sheltered crevices, cavities, bluffs, high walls, or rocky ledges overlooking valleys within range of open grasslands, wet meadows, and shrub-steppe deserts • Largely unvegetated • Minimal human disturbance, especially in proximity to nesting birds 	

Strategies Applied to Achieve Objective

Prohibit mining and rock removal, except by the Refuge and according to valid permits for use of existing gravel/rock pits.

Prohibit rock climbing.

Rationale:

This habitat type is not actively managed. These areas will be protected from disturbance (rock mining, climbing, etc.) due to their high value for nesting birds as well as reptiles, mammals, and other wildlife.

Public Use Goals

The following goals and objectives cover facilities and programs associated with wildlife-dependent recreational uses (the “Big Six”): wildlife observation, wildlife/nature photography, interpretation, environmental education, hunting, and fishing. Objectives for related activities, including welcome and orientation, volunteers, partnerships, law enforcement, and transportation, are also included.

Although all of the wildlife-dependent recreational uses will be provided on the Refuge, the cornerstone of the program will be providing quality wildlife observation and wildlife/nature photography opportunities. Interpretation and welcome and orientation features are also high priorities. These programs will be focused on enhancing visitor experiences and promoting the key values and features unique to the Refuge: a renowned diversity of wildlife, signs of earlier inhabitants, remoteness, and solitude. Environmental education, hunting, and fishing will also be provided, but with less commitment of refuge staff time than the other programs. However, additional areas will be opened to enhance opportunities for hunting and fishing. Each of these programs will be supported with the help of volunteers and partnerships.

Quality will be emphasized for each use and program. The definition of “quality” for wildlife-dependent recreational uses is defined in refuge policy by several elements ([605 FW 1](#)):

- Promotes safety of participants, other visitors, and facilities;
- Promotes responsible behaviors and compliance with applicable laws and regulations;
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives;
- Minimizes or eliminates conflict with other compatible wildlife-dependent recreation;
- Minimizes conflicts with neighboring landowners;
- Promotes accessibility and availability to a broad spectrum of the public;
- Promotes resources stewardship and conservation;
- Promotes public understanding and increases public appreciation of natural resources and the Refuge’s and National Wildlife Refuge System’s roles in managing and protecting these resources;
- Provides reliable, reasonable opportunities to experience wildlife;
- Uses facilities that are accessible and blend into the natural setting; and
- Uses visitor satisfaction to help define and evaluate programs.

GOAL 6. Welcome visitors and offer them a safe experience of the Refuge’s outstanding features: diversity of wildlife, signs of earlier inhabitants, scenic landscapes, and solitude. As a result, visitors will leave the Refuge with a memorable experience that fosters a connection between themselves and nature, and with an appreciation of Malheur Refuge’s unique resources.

Objective 6a. Provide Welcome and Orientation to Visitors

Provide an integrated set of welcome and orientation features for visitors to:

- Feel welcomed
- Easily find accurate, timely, and appropriate orientation materials and information
- Be aware of their options (available activities and experiences, where and when to go, how to get there, etc.)
- Safely pursue self-guided activities.

Welcome and orientation features shall be characterized as follows:

- Both modern and traditional media will be used to reach and orient visitors to the Refuge
- Entrance signage welcoming visitors to Malheur Refuge will be located at all seven refuge entrances and road junctions at Refuge Headquarters, Malheur Field Station, both access points at Buena Vista, Krumbo Lane, P Lane, and Double-O
- Directional signs that alert visitors to the presence of nearby attractions (such as “Krumbo Reservoir – Fishing”, “Visitor Center” or “Contact Station”) will be posted on State Highway 205 and along the auto tour route (Center Patrol Road) in appropriate locations
- Outdoor welcome and orientation panels will be provided at four to eight locations to direct and guide visitors
- Maps, brochures, regulations, and additional information on the outdoor welcome and orientation panels will be positively worded and available at attractive and visible structures, such as masonry work, near main refuge entrances and at areas where visitors tend to congregate, especially at the Narrows Pull-out, Buena Vista, Krumbo Reservoir, P Ranch, and Frenchglen
- Five to 10 clean, well maintained, and accessible developed sites with visitor amenities, such as picnic tables, shelters, and vault toilets will be provided in logical and appropriate locations in the Blitzen Valley and at Double-O
- Structures and developed sites will be built to blend in with the surrounding features and habitat
- Daily opportunities for personal contact with refuge staff and volunteers at Refuge Headquarters and P Ranch contact station will be provided

Strategies Applied to Achieve Objective

Continue to maintain and update existing modern and traditional media (website, brochures, Flickr account, etc.) to reach and orient visitors. Use other modern media as appropriate.

Develop step-down plans for outdoor panels, facilities, and signs.

Continue to maintain and update four existing outdoor panels to welcome and orient visitors at:

- Narrows Pull-Out
- Refuge Headquarters
- Buena Vista

<ul style="list-style-type: none"> • Frenchglen <p>Develop additional outdoor welcome and orientation panels at:</p> <ul style="list-style-type: none"> • Krumbo Reservoir • P Ranch • Harney Lake • Double-O
<p>Maintain existing developed sites with visitor amenities such as picnic tables, shelters, and vault toilets at:</p> <ul style="list-style-type: none"> • Refuge Headquarters • Buena Vista • Krumbo Reservoir • P Ranch <p>Provide additional developed sites:</p> <p>Complete Developed Sites</p> <ul style="list-style-type: none"> • Double-O <p>Vault Toilet Only</p> <ul style="list-style-type: none"> • Sod House Ranch <p>Picnic Tables and Shelters Only</p> <ul style="list-style-type: none"> • Refuge Headquarters (ADA-compliant) • Buena Vista Overlook • P Ranch
<p>Build an enlarged visitor contact station and gift shop at Refuge Headquarters.</p>
<p>Enhance George Benson Memorial Museum to meet ADA standards and meet preservation standards to protect specimens.</p>
<p>Establish a seasonal contact station at P Ranch, and provide staffing as available with volunteers during spring, summer, and fall.</p>
<p>Continue to consider/participate in discussions for an interagency visitor facility off-refuge.</p>
<p>Rationale:</p> <p>A high number of visitors to the Refuge are new to the area and benefit from direction and guidance especially at refuge entrances and road junctions. The strategies focus on providing quality customer service and improving information and orientation availability. Utilizing modern and traditional media, and providing outdoor welcome and orientation panels and developed sites that are clean, well maintained, and accessible, while also not detracting from the surroundings, will be emphasized. This objective and its strategies are aimed at ensuring that information provided to visitors is clear so visitors can easily determine where they can go, what they can do, and how to safely and ethically engage in wildlife-dependent recreational uses.</p>

<p>Objective 6b. Address Transportation Issues and Concerns</p>
<p>Develop a transportation plan for existing and needed roads, bridges, pull-outs, access points, parking areas, trails, and other elements of transportation infrastructure that support public uses and refuge management needs as identified within other CCP objectives. The transportation plan will:</p> <ul style="list-style-type: none"> • Develop strategies for maintaining three to six public roads, parking areas and several vehicle

<p>pull-offs, to minimum public safety standards</p> <ul style="list-style-type: none"> • Consider provisions, according to management and public use needs, for vehicles, farming equipment, bicycles, school buses or other larger vehicles, and pedestrians • Include ancillary facilities, such as interpretive signage, environmental education shelters, restrooms, parking areas, boat launches, etc. • Address potential impacts to wildlife and associated habitats • Include a safety audit of all transportation facilities identified above • Include a prioritized list of construction and improvement items • Implement as funds become available to bring all facilities up to approved Service standards
<p>Strategies Applied to Achieve Objective</p>
<p>Continue to maintain existing refuge public roads:</p> <ul style="list-style-type: none"> • 42-mile Blitzen Valley auto tour route (Center Patrol Road) • Krumbo Reservoir • P Lane <p>Enhance the following refuge public roads:</p> <ul style="list-style-type: none"> • Boating Landing Road • East Canal Road to the confluence of Bridge Creek • Double-O • Saddle Butte hunt access
<p>Continue to maintain a variety of vehicle pull-offs (one or two vehicle lengths) on the 42-mile Blitzen Valley auto tour route (Center Patrol Road) and develop the following additional vehicle pull-offs to assist with wildlife observation and wildlife/nature photography, hunting, and fishing programs:</p> <ul style="list-style-type: none"> • Boating Landing Road • East Canal Road to the confluence of Bridge Creek
<p>Maintain existing parking areas and develop the following parking areas to assist with wildlife observation and wildlife/nature photography, hunting, and fishing programs:</p> <ul style="list-style-type: none"> • Bridge on Boat Landing Road • Airboat launch site (to ADA standards) • East Canal at the confluence of Bridge Creek
<p>Work with local and State governments to identify alternative funding sources and cost-sharing opportunities for maintenance of and improvements to the transportation system to and through the Refuge.</p>
<p>Partner with the Federal Highway Administration, ODOT, local county road departments, and others to develop the transportation plan and safety audit.</p>
<p>Rationale:</p> <p>A comprehensive transportation plan and safety audit is needed to ensure the safest and most efficient access for visitors, cooperative ranchers, and others who need to access the Refuge. A transportation plan will also assist the Refuge in obtaining funds available under Federal and State transportation authorities for project implementation.</p>

GOAL 7. Connect the hearts and minds of visitors with the places and resources the Refuge protects, and enlighten visitors' experiences with an understanding of, appreciation for, and knowledge about historic and natural resources, and the importance of conservation and stewardship.

Objective 7a. Provide Wildlife Observation and Wildlife/Nature Photography Opportunities to the Casual Visitor and Beginning to Moderate Birders

Provide casual visitors and beginning to moderate birders with a variety of structured opportunities to view wildlife, observe nature, and photograph wildlife and the surrounding landscape. The program shall:

- Provide docent-led tours, approximately monthly, at different locations on the Refuge, including into areas that are normally closed to the public
- Provide occasional opportunities to experience Malheur Lake with docent-led kayaking and canoeing tours
- Integrate the interpretive program with observation and photography opportunities so that visitors can make their own discoveries (see Objective 7c)
- Provide a variety of vehicle pull-offs on the 42-mile Blitzen Valley auto tour route (Center Patrol Road) at key locations to enhance the birding experience
- Provide an opportunity for exercise and enhanced opportunities for solitude as part of the recreational experience by providing two to four loop trails (≥ 1 mile)
- Provide at least five or six spur trails to good birding sites, with some trails meeting ADA standards
- Include trail signs (e.g., trail access information (TAI) signs) posted at all trailheads (see photo).
- Provide access to five to seven developed viewing facilities, such as overlooks and platforms at key locations for viewing wildlife and landscapes
- Provide opportunities for quality photography in three first-come/first-served permanent, ADA-compliant photography blinds or temporary, day-to-day basis photography blinds



Strategies Applied to Achieve Objective

Docent-led Tours

Continue to provide docent-led tours in conjunction with the annual John Scharff Migratory Bird Festival.

Advertise and provide docent-led tours, approximately monthly, to a variety of audiences for the purposes of viewing wildlife and habitats at different locations on the Refuge. Tours may include kayaking or canoeing on Malheur Lake. Encourage advanced birders to volunteer to lead docent-led tours for the general public and groups.

Auto Tour Route and Vehicular Access

Continue to maintain existing refuge public roads on the 42-mile auto tour route (Center Patrol Road), Krumbo Reservoir, and P Lane. Provide additional vehicle access year-round, except when road conditions are hazardous, at Boat Landing Road, Krumbo Reservoir, and East Canal Road to confluence of Bridge Creek.

<p>Participate in Basin and Range Birding Trail on-refuge with Harney County Chamber of Commerce and other partners.</p>
<p>Trails</p>
<p>Provide trails listed below. Mark all existing and new trailheads with trail signs (e.g., TAI).</p> <p>Spur Trail</p> <ul style="list-style-type: none"> • Frenchglen to Barnes Springs Footpath <p>Loop Trails (≥1 mile)</p> <ul style="list-style-type: none"> • Refuge Headquarters along the Blitzen River and Display Pond (Headquarters Loop Trail) • Connect Bridge Creek Trail, River Trail, and East Canal Trail with pedestrian crossings and boardwalks <p>ADA-compliant Trails</p> <ul style="list-style-type: none"> • Sections of Headquarters Loop Trail • Sod House Ranch (upgrade to ADA standards) • Benson Pond • P Ranch
<p>Propose alternative route to enhance the Desert Trail and post appropriate Desert Trail signs at logical locations.</p>
<p>Observation and Photography Features</p>
<p>Provide viewing features listed below and develop step-down plans for viewing overlooks and platforms.</p> <p>Viewing Overlooks</p> <ul style="list-style-type: none"> • Krumbo Reservoir (ADA-compliant) <p>Elevated Viewing Platforms</p> <ul style="list-style-type: none"> • Historic CCC lookout tower at Refuge Headquarters • Malheur Lake at airboat launch site • Harney Lake • Double-O
<p>Restore historic Audubon photography blind at Refuge Headquarters Display Pond.</p>
<p>Provide two ADA-compliant, first-come/first-served permanent photography blinds for high-quality wildlife photography at appropriate locations.</p>
<p>Allow boating use (nonmotorized or electric boats, kayaks, canoes, etc.) that is not directly supporting fishing at Krumbo Reservoir year-round, except when reservoir begins to ice over.</p>
<p>Require a yearly special use permit for for-profit commercial wildlife guiding and commercial photography uses on the Refuge.</p>
<p>Rationale:</p> <p>During scoping, casual visitors and beginning to moderate birders expressed a need for increased access, vehicle pull-offs near a variety of trails, viewing and photography facilities, and other opportunities for this user group. Wildlife observation is the primary visitor activity that occurs on the Refuge, but visitors also come to enjoy the area’s wide open spaces, geology, and historic resources. The Refuge provides docent-led tours during the John Scharff Migratory Bird festival to closed areas of</p>

the Refuge; visitors respond enthusiastically to these tours. An expanded use of docent-led tours will promote relationship-building between the Refuge and visitors, create greater awareness of the values of Malheur Refuge, and allow occasional access to areas that are normally closed to refuge visitors, in a manner that minimizes conflicts with fish and wildlife population or habitat goals. Connecting people to nature is a national initiative that the Refuge will contribute to via the strategies described above. Providing docent-led tours on Malheur Lake by kayak and canoe will enhance the opportunity for freedom and experience of one of the Refuge’s most well-known landmarks, and provide an opportunity to educate visitors about the management challenges posed by invasive common carp and the degradation of important habitat on the lake. Continuing to provide an auto tour route, while enhancing the experience by providing additional areas for vehicle access and pull-offs, providing longer trails, and providing additional viewing and photography facilities, will also help to meet a visitor need to connect with the larger landscape and resources.

Objective 7b. Provide Opportunities to View Rare and Incidental Species to Advanced Birders

Provide advanced birders with continued opportunities to enjoy sightings of rare and incidental birds, particularly passerines. The Refuge will:

- Maintain four to six sites (approximately 300 acres) of habitats characterized by cottonwood trees, other non-endemic trees, and shrubs associated with historic landscapes

Strategies Applied to Achieve Objective

Participate in and promote real-time rare bird alerts utilizing modern media.

Prepare and implement a site plan for Refuge Headquarters that incorporates birders’ concerns, such as maintaining cottonwood trees, other non-endemic trees, and shrubs.

Prepare and implement site plans to maintain cottonwood trees, other non-endemic trees, and shrubs at Sod House Ranch, Benson Pond, Witzel Field, Barnes Springs, and P Ranch.

Conduct vegetation management of invasive species in ways that do not interfere with the ability of the identified sites to host rare and incidental species.

Integrate vegetation management and access at the identified sites with appropriate cultural resource protection and interpretation (see Goal 10).

Continue to maintain seasonal closure at Sod House Ranch to protect heron rookery.

Rationale:

Advanced birders are a small but important component of the visitor base at the Refuge. Some of the trees that host the rare and vagrant species are not native to the area but were brought in deliberately by early settlers for shade. Because these special birding sites are located at sites of historic significance, maintaining a component of tall shade trees meets both the objective of providing habitat for rare and incidental species, and the purpose of providing a continued “look and feel” characteristic to these historic landscapes. In addition to these reasons, these sites occupy a small percentage of the overall refuge landscape and also provide values to native wildlife, including a heron rookery at Sod House Ranch; therefore, we consider it acceptable to maintain and promote this non-native vegetative component.

Objective 7c. Provide Interpretive Opportunities of Key Resources and Issues

Provide a variety of interpretive opportunities to connect refuge visitors and the local community with historic and natural resources. Interpretive features shall be characterized as follows:

- Enhance uses of modern media to convey information to visitors and enhance opportunities for

<p>self-guided or multisensory experiences</p> <ul style="list-style-type: none"> • Provide a range of traditional interpretive materials and programs, including indoor and outdoor interpretive panels, approximately monthly presentations, and four to seven local events • Provide well-marked outdoor interpretive panels that include “attractants” to slow and encourage visitation, such as masonry work <p>Using various methods, advance visitor understanding of the following key themes:</p> <ul style="list-style-type: none"> • Historical and current significance of the Refuge to breeding and migratory birds • Precontact and post-contact history (see Goal 10) • CCC work in the area (see Goal 10) • Wilderness • Geology and paleontology • Aquatic health • Water’s importance, hydrology, and movement across the landscape • Primary refuge wildlife, habitat, and resources management objectives and management challenges, and methods • Role and importance of the National Wildlife Refuge System • An understanding of visitors’ relationships to, and impacts on, natural and cultural resources to encourage and inspire them to become stewards of the lands
<p>Strategies Applied to Achieve Objective</p>
<p>Regularly maintain and update information on key interpretive themes via a variety of media such as websites and brochures. Make greater use of modern media such as CDs, podcasts, social media, etc.</p>
<p>Provide new interior panels in the George Benson Memorial Museum to connect visitors with places and the resources the Refuge protects.</p>
<p>Continue to maintain five existing outdoor interpretive panels at Narrows Pull-out, Refuge Headquarters, Sod House Ranch, Buena Vista Overlook, and P Ranch. Provide additional outdoor interpretive panels at key field sites to appropriately implement key interpretive themes, and focus on aquatic health and associated management activities and weaving historic events and ecology of the Refuge.</p>
<p>Participate in local events, on- and off-refuge, providing docent-led activities and visits to specified sites with booths and educational materials as appropriate:</p> <ul style="list-style-type: none"> • John Scharff Migratory Bird Festival (April) • Free Fishing Day (June) • Invasive Carp Awareness (August) • Harney County Fair (September) • International Migratory Bird Day (May) • Ranching Heritage Day combined with Invasive Carp Awareness (August) • National Wildlife Refuge Week (October)
<p>Continue to provide public presentations by refuge staff and volunteers at least monthly. Advertise and share presentations by utilizing modern media.</p>
<p>Rationale:</p> <p>Interpretive features and programs emphasizing key interpretive themes relevant to the Refuge can greatly assist visitors in discovering the resources and understanding the role and relevance of the</p>

Refuge. The visiting public has expressed a need for a stronger emphasis on connecting visitors with places and resources the Refuge protects, and enlightening visitors' experiences through interpretive panels, docent-led tours, special events, and group presentations. Investing in such programs and facilities is consistent with the Refuge System mission and will expand refuge support and relationships.

Objective 7d. Support and Provide Environmental Education Programs

In partnership, implement environmental education programs that:

- Emphasize enjoyable, hands-on, outdoor learning
- Integrate key interpretive themes (see Objective 7c)
- Promote discovery and wildlife awareness
- Build understanding and appreciation of the Refuge's historic and natural resources
- Promote conservation and stewardship

The program shall be characterized as follows:

- Facilitate on- and off-refuge education for all ages for ≥ 500 students annually, with a target audience of local first and third graders
- Partner with other environmental education initiatives to promote assistance with programs, activities, and exhibits
- Support local, state, and national education standards and other curricula
- Serve formal educators (i.e., teachers) and informal educators (i.e., Scouting group leaders)
- Use various refuge resources to assist with environmental education activities, and use refuge facilities, including wildlife observation structures, interpretive panels, trails, etc.
- Coordinate and assist with other environmental education initiatives

Strategies Applied to Achieve Objective

Continue to conduct existing environmental education program and ongoing collaboration with environmental education initiatives.

When refuge staff and volunteers are available, use and implement existing curricula, and national and regional environmental education modules, such as Junior Duck Stamp Program, International Migratory Bird Day, etc., on- and off-refuge.

Coordinate and assist with local environmental education initiatives upon request.

Review and revise as needed the Cooperative Agreement between the Great Basin Society/Malheur Field Station and the Refuge.

Build an outdoor shelter at Refuge Headquarters where environmental education activities can be conducted during periods of inclement weather.

Provide an outdoor learning area at Refuge Headquarters to assist with existing environmental education program and efforts with other environmental education initiatives.

Require a yearly special use permit for non-profit groups and educational institutions engaging in EE programs on the Refuge.

Rationale:

The Refuge has an opportunity to support and provide environmental education programs for local schools, universities, and other educational or community groups, in partnership with other local environmental education initiatives. Using and enhancing partnerships with established programs like these, and using ready-made national curricula will provide greater efficiency for the Refuge and build community relationships. The existing environmental education program will remain, and when staff

and volunteers are available existing curricula and national and regional environmental education modules will be used and implemented. Provision of specified outdoor learning facilities will promote enjoyable and hands-on learning and an integrated curriculum at key target sites, while mitigating demands on the Refuge's indoor spaces.

GOAL 8. Provide reasonable challenges and opportunities, and provide uncrowded conditions for the hunting and fishing public.

Objective 8a. Provide Hunting Opportunities for Upland Game

Provide high-quality hunting opportunities for upland game hunting in the Malheur Lake, Buena Vista, and Boundary hunt units, for the species, seasons, and other details described in the Hunt Plan (Appendix P).

The program shall be managed such that:

- Youth are provided added emphasis
- Conditions are uncrowded, with abundant opportunities for solitude over 58,000 allowable hunting acres
- The hunt is safe and managed to minimize conflicts with wildlife and other priority wildlife-dependent recreational uses
- Access is provided on suitable all-weather access roads
- Game are wild or naturalized (not stocked)
- Most hunters reach their quota each day
- Refuge staff engages in close cooperation and coordination with State fish and wildlife management agencies for management of hunting opportunities on the Refuge and in setting population management goals and objectives
- Hunt is consistent with State fish and wildlife laws, regulations, and management plans

Strategies Applied to Achieve Objective

Update existing hunting brochure and website to explain upland game hunting opportunities and regulations; update Code of Federal Regulations [CFRs] per revised Hunt Plan (Appendix P).

Malheur Lake Hunt Unit

Maintain hunt program under current regulations, except drop rabbit from the list of allowable species. Improve Saddle Butte access on north side of Malheur Lake Hunt Unit (see Appendix P).

Buena Vista Hunt Unit

Maintain hunt program under current regulations, except drop rabbit from the list of allowable species and extend season opener from the fourth Saturday of October to the end of the State pheasant season (see Appendix P).

Boundary Hunt Unit

Manage hunt program as described in Hunt Plan (Appendix P).

Rationale:

The most substantial modification suggested for the upland game hunt on the Refuge under the management direction is the season extension for the Buena Vista Unit; this will provide greater hunting opportunity. The hunt openers have been designed to minimize disturbance to staging sandhill cranes, which do not use the northern part of the Malheur Lake Hunt Unit; hence, this unit will remain open at the same time as the regular State season, thus spreading out the openers across two weekends

and reducing crowding.

Greater vehicular access for the Buena Vista Unit was considered but rejected because many believe the free-roaming, off-road nature of the hunt is one of its key assets. The P Ranch Unit was also considered but was rejected due to conflicts with wintering waterfowl, which use the P Ranch Unit more heavily than other units because of the access to open water, which is limited during winter on the Refuge.

Rabbit will be dropped from the Malheur Lake and Buena Vista hunt units because this species may be taken at any time of day or night, and this presents a conflict with the hunts as designed for these units.

Objective 8b. Provide Hunting Opportunities for Waterfowl

Provide high-quality opportunities for waterfowl hunting in the Malheur Lake, Buena Vista, and Boundary hunt units, for the species, seasons, and other details described in the Hunt Plan (Appendix P).

The program shall be managed in such that:

- Youth are provided added emphasis
- Conditions are uncrowded with abundant opportunities for solitude over 63,000 allowable hunting acres
- The hunt is safe and managed to minimize conflicts with wildlife and other priority wildlife-dependent recreational uses
- Access is provided on suitable all-weather roads
- Hunters can enjoy a range of waterfowl hunting experiences, ranging from traditional setup with decoys and dogs to jump-shooting
- Parking areas are adequate, with parking at three existing locations and one new parking area and boat launch at the airboat launch site to access a new hunt opportunity on the southern side of Malheur Lake
- Most hunters reach their quota each day
- Refuge staff engages in close cooperation and coordination with State fish and wildlife management agencies for management of hunting opportunities on the Refuge and in setting population management goals and objectives
- Hunt is consistent with State fish and wildlife laws, regulations, and management plans

Strategies Applied to Achieve Objective

Update existing hunting brochure, website, and CFRs to explain waterfowl hunting opportunities and regulations.

Malheur Lake Hunt Unit

Manage the waterfowl/migratory bird hunt on Malheur Lake Unit as described in Appendix P.

Promote waterfowl youth hunt opportunity on State-designated weekend in the northern Malheur Lake Hunt Unit.

Improve Saddle Butte access on north side of Malheur Lake Hunt Unit.

Expand allowable boundary to include south-central area of Malheur Lake with special date regulations of the fourth Saturday of October to the end of the State waterfowl season.

Open new boat access for nonmotorized or electric boats on Malheur Lake at the airboat launch site near Refuge Headquarters with expanded parking and a boat launch (ADA standards). Opening date for the access will be the on the fourth Saturday of October to the end of the State waterfowl season.

At low water (<10,000 acres), close Malheur Lake to waterfowl hunting.
The new Caspian tern island in the South Malheur Lake Unit will be permanently closed to hunting.
Buena Vista Hunt Unit
Open Buena Vista Hunt Unit to waterfowl hunting with special date regulations, from the fourth Saturday of October to the end of the State pheasant season. Boats will not be permitted. See Appendix P for details.
Support reasonable waterfowl hunting opportunities that comply with the ADA in partnerships with potential users.
Boundary Hunt Unit
Continue to allow waterfowl/migratory bird hunting within the Boundary Hunt Unit under existing regulations (see Appendix P).
<p>Rationale:</p> <p>Although historically Malheur Lake was renowned for its waterfowl hunting opportunities, currently the waterfowl hunt is perceived as poor quality. The key issue preventing greater success is seen as the plenitude of invasive common carp in the lake. Access is also poor from the existing access points; lake fluctuations often preclude opportunities to provide easy drive-in access to reliable boat launches on most parts of the lake. Hence, at the present time, few hunters hunt the lake and those who do rarely use boats to access the lake. Providing a fourth access point at the more reliable airboat launch site on the Blitzen River delta near Refuge Headquarters will allow hunters to access a larger portion of the lake by boat and provide additional opportunities for hunting. As aquatic health improves (see Objective 1a), waterfowl hunting opportunities on the lake should improve.</p> <p>Opening the Buena Vista Hunt Unit will provide a quality experience in a large additional area with good access. This unit has some wetlands and the mainstem of the Blitzen River. Hunters may walk in and set up decoys on some of the wetlands or jump-shoot as opportunities present themselves. Although the small size of ponds and wetlands could pose competition and disturbance issues, the limited number of hunters past opening weekend will likely mitigate against these concerns. Safety issues along the auto tour route (Center Patrol Road) will also be mitigated as visitor use is expected to be light during the hunting season.</p> <p>Other areas considered for waterfowl hunting included the P Ranch and Double-O units. With the change in water rights, there could be a potential opportunity to flood up additional areas for hunting in the Blitzen Valley. However, most of the additional water will arrive early in the spring, so it will not be available during prime waterfowl hunting time. In addition, the P Ranch Unit was also rejected as a hunt unit due to conflicts with wintering waterfowl, which use the P Ranch Unit more heavily than other units because open water is more concentrated in the P Ranch Unit during winter. The Double-O Unit is considered more sensitive to biological and cultural resource disturbances, but a weekend youth hunt may be possible while limiting the amount of disturbance.</p>

Objective 8c. Provide Stream Fisheries Aimed at Experienced Fly-fishers and Other Anglers
<p>Provide a high-quality, challenging, semiprimitive fishing opportunity aimed at experienced fly-fishers and non-bait anglers along the upper Blitzen River, a portion of the East Canal, and tributaries (collectively known as the South Fishing Loop), and along a new fishing opportunity near Refuge Headquarters. The program shall be managed such that:</p> <ul style="list-style-type: none"> • Drive-in access is available in close proximity on approximately 3 miles of the stream opportunity, with pedestrian crossings for walk-in access to 7 miles of fishable area west of the East Canal to the confluence of Bridge Creek at the Blitzen River • Conditions are uncrowded, with abundant opportunities for solitude over 11 miles of river

<ul style="list-style-type: none"> • Minimal facilities are present for a more undeveloped experience • Maps, brochures, regulations, and additional information are positively worded on panels and available at attractive and visible structures, such as wooden kiosks, at all five fishing entrances; • Redband trout and other native fish are present • Conflicts with wildlife and other priority wildlife-dependent recreational uses are minimized; • Refuge staff engages in close cooperation and coordination with State fish and wildlife management agencies for fisheries management • Fishing is consistent with State fish and wildlife laws, regulations, and management plans
<p>Strategies Applied to Achieve Objective</p>
<p>Continue to allow fishing opportunities in the areas identified in this objective’s other strategies and under regulations currently in place and specified.</p>
<p>Allow drive-in access on East Canal Road to the confluence of Bridge Creek with access to Granddad Reservoir (BLM), except when road conditions are hazardous.</p>
<p>Build a new pedestrian crossing and boardwalks at Bridge Creek to access a portion of the fishable area west of East Canal to its confluence of Bridge Creek with the Blitzen River.</p>
<p>Open new seasonal bank fishing opportunity from Sodhouse Lane to the bridge on the Boat Landing Road, part of the Headquarters Loop Trail. Dates for fishing access will be August 1 to September 15.</p>
<p>Develop five outdoor panels with maps, brochures, regulations, and additional information at main entrance points, such as the East Canal, P Ranch, Bridge Creek, Sodhouse Lane, and the bridge on the Boat Landing Road, and provide additional signing.</p>
<p>Rationale:</p> <p>The fishery as currently managed offers a semideveloped experience with greater challenge than the Krumbo Reservoir fishery. Re-opening the East Canal Road to Bridge Creek to vehicles under The management direction will provide greater access, including access to Granddad Reservoir (BLM). Currently, members of the fishing public either cannot or do not wish to walk long distances. Opening a new seasonal bank fishing opportunity from Sodhouse Lane to the bridge on the Boat Landing Road near Refuge Headquarters will also provide additional fishing opportunity.</p>

<p>Objective 8d. Provide a Reservoir Fishery Aimed at Successful Take for Casual Anglers</p>
<p>Provide a quality year-round fishing opportunity at Krumbo Reservoir aimed at providing successful trout and bass fishing for beginning, casual, and local anglers. The program shall be managed such that:</p> <ul style="list-style-type: none"> • Visitors can drive in and walk short distances • Anglers may fish from the shoreline, on the accessible fishing dock, or by boat • Access for visitors with disabilities is available • Clean and maintained facilities, including vault toilets, picnic tables, and shelters, are available • Maps, brochures, regulations, and additional information will be positively worded and available at one attractive and visible structure, such as a wooden kiosk at the main parking area • Numerous catchable fish are present • Managed to minimize conflicts with wildlife and other priority wildlife-dependent recreational uses • Refuge staff engages in close cooperation and coordination with State Fish and Wildlife management agencies for stocking of fish and fisheries management • Fishing is consistent with State fish and wildlife laws, regulations, and management plans

Strategies Applied to Achieve Objective
Develop fishing brochure to explain fishing opportunities and regulations, and update existing website.
Continue coordination with ODFW and stocking of Krumbo Reservoir with triploid rainbow trout with steps to undertake genetic introgression study on redband trout (See Objective 13d).
Open Krumbo Reservoir to fishing year- round with drive-in access, except when road conditions are hazardous. For safety reasons, ice fishing or nonmotorized or electric boats will not be permitted when the reservoir begins to ice over.
Develop one panel with maps, brochures, regulations, and additional information at the main parking area.
<p>Rationale:</p> <p>Providing access for fishing (and other uses) year-round is a way to provide greater opportunity for this use and to avoid the opening day rush and overcrowding that currently occurs in the spring. As noted in a strategy under Objective 7a, it will also allow use of the area during fall, winter, and spring for wildlife observation and hikers. Some wintering use by diving ducks, swans, and other wintering waterfowl occurs on the reservoir, but since wintertime visitor use is expected to be light, any disturbance that may occur is not expected to significantly impact these species. Wildlife surveys will be underway in the winter of 2010-2011 to evaluate the extent of wildlife use and to estimate future wildlife disturbance. Camping was requested by several members of the public during scoping and was considered for Krumbo Reservoir to support the fishing experience; it was determined that it is unnecessary to provide camping in the area because of the availability of nearby camping opportunities on BLM and at the Narrows, and because of the demands camping would place upon refuge staff and law enforcement.</p> <p>The CCP team recommends continuing the current practice of stocking the reservoir with triploid rainbow trout, a non-native fish. Transitioning the fishery to a native redband trout fishery was considered but a variety of steps would need to be undertaken (public review, genetic introgression study, and regulation change). If the fishery was transitioned to a native fishery, it would likely require a regulation change to catch-and-release or two-fish limit. Although the stocking of non-native species is discouraged under refuge policy (601 FW 3), in this case it is justified because of the importance of this recreational opportunity to local and nonlocal visitors. There are only a few other such opportunities for year-round fishing in southeast Oregon.</p>

GOAL 9. Enhance Refuge Programs, Partnerships and Public Outreach

Objective 9a. Enhance Refuge Programs, Partnerships and Public Outreach with Volunteer Opportunities
<p>Build a volunteer program and partnerships to help the Refuge achieve its mission and goals. The programs shall:</p> <ul style="list-style-type: none"> • Identify ways the Malheur Wildlife Associates can best support the Refuge • Provide volunteer opportunities that allow the public to maximize their interaction with refuge facilities and staff • Focus on priority projects that will enhance the wildlife and habitat on the Refuge, and support a variety of projects and programs • Focus on building partnerships and public outreach • Increase recruitment, retention, and a volunteer return rate of $\geq 50\%$

Strategies Applied to Achieve Objective
Continue to conduct existing volunteer program and ongoing collaboration with Malheur Wildlife Associates, including assisting with building their capacity.
Establish a full-time volunteer coordinator position that will focus specifically on improving the volunteer program, such as by increasing recruitment, retention, and return rate of volunteers and expanding the program for efficient use of facilities and Refuge staff. The position will also focus on building partnerships and increasing public outreach.
<p>Rationale:</p> <p>Although the Refuge is remote, current capacity for supporting volunteers is relatively high. The Refuge has six RV pads with full hookups; in addition, two bunkhouses with 11 bedrooms provide the potential to support up to 15 volunteers at any one time. Typically 50 volunteers are on-site between March and October, each serving approximately two months. Over 5,000 hours are contributed annually with a return rate of at least 50%. However, to increase the volunteer program without additional assistance will be difficult. Establishing a full-time volunteer coordinator position will enable desired improvements to the program, efficient use of facilities, and more use of volunteers by Refuge staff.</p>

Objective 9b. Maintain an Effective Law Enforcement Presence
Establish and maintain an effective, professional, and courteous law enforcement presence to discourage unauthorized uses and maintain reported incidents at a flat or declining trend over a 15- year period.
Strategies Applied to Achieve Objective
In connection with Objective 6a, improve posting of regulations at key welcome and orientation sites, as well as locations where fishing and hunting uses predominate (Krumbo Reservoir, Malheur Lake, Buena Vista Unit, etc.).
Maintain current law enforcement staffing (one dedicated law enforcement officer).
Continue cooperative relationships and agreements with Oregon State Police and Harney County Sheriff’s office.
Continue to emphasize information, education, and a friendly presence in the field during key seasons.
Improve fencing in certain refuge boundary areas to minimize trespass cattle.
<p>Rationale:</p> <p>Enforcement of Federal wildlife laws, regulations specific to the Refuge System, and State laws is an essential component of refuge operations; enforcement ensures that natural and cultural resources are protected and that visitors have a safe environment. Fortunately, law enforcement incidents at the Refuge are relatively few compared to other refuges. The predominant law enforcement concerns center on cultural resource protection, trespass cattle, and fishing and hunting compliance. Cooperative relationships with other law enforcement organizations improve effectiveness.</p>

Objective 9c. Engage Partners and Stakeholders in Adaptive Management
Continue to work with partners and stakeholders in the pursuit of the best available science to further our understanding of the effects of implementing management activities, evaluating methods and techniques, and initiating adaptive management to address needed changes.

Strategies Applied to Achieve Objective
Via the Ecology Work Group, develop the Malheur Refuge State-and-Transition Model (STM) (see Appendix L).
Implement use of the Malheur Refuge STM.
Use the Malheur Refuge STM as a framework for presenting results of management activities to partners and stakeholders.
Via the Aquatic Health Coalition’s workgroups (control, assessment, and partnership and funding) develop grant proposals and conduct research to adaptively manage aquatic health. Communicate via the Aquatic Health Coalition list serve.
Rationale: The benefits of the STM concept for Malheur Refuge are greater than the ecological understanding of refuge habitat it promotes. The STM is a living model that is continually transformed as new information is gleaned over time and because of this, it introduces an amplified dependence on actualized adaptive management. It also provides a framework for organizing results and reporting them to the interested public. The STM and the Aquatic Health Coalition provide transparency, heightened and continued interaction with partnering agencies/organizations, and accountability for continued monitoring of management actions. The desired outcome is to work collaboratively with others to address habitat management and aquatic health needs using the best available science, innovative methods and techniques, and transparency. The Refuge is committed to keeping our partners engaged as we move forward with adaptive management activities.

GOAL 10. Manage prehistoric and historic cultural resources for their educational, scientific, and cultural values for the benefit of present and future generations of refuge users and for the communities that are connected to these resources.

Objective 10a. Identify and Protect Prehistoric and Historic Archaeological Resources
Increase monitoring and protection of all cultural resources, prehistoric and historic, on the Refuge while increasing public and staff support and appreciation.
Strategies Applied to Achieve Objective
Continue to identify archaeological sites and historic structures that coincide with existing and planned roads, facilities, public use areas, habitat restoration, and research projects. Prepare and implement activities to mitigate impacts to sites as necessary.
Implement a program to evaluate eligibility for listing on the NRHP for those archaeological sites and historic structures that may be impacted by Service undertakings, management activities, erosion, or neglect.
Develop a historical buildings management plan with list of maintenance and restoration needs by structure. Prioritize the list by structure and include estimated repair costs. Actively seek funding and develop partnerships to maintain and protect structures.
Coordinate with the Tribe on cultural resources inventory, evaluation, and project monitoring, consistent with the regulations of the NHPA. Protect all identifiable archaeological sites by avoiding disturbance within the area.
Develop and strengthen partnerships with educational and historic institutions for the interpretation and

protection of cultural resources at the Refuge.
Facilitate partnerships with other appropriate Federal and State agencies, professional archaeologists, descendants of early settlers, and the general public to aid in the management of cultural resources.
Rationale: Various Federal historic preservation laws and regulations require the Service to implement the kind of program described under this objective. Providing adequate attention and resources to these responsibilities will identify areas to be avoided by disturbances associated with projects being implemented by Refuge staff as they focus on other land, habitat, and wildlife management efforts.

Objective 10b. Provide Interpretation of Cultural Resources
Increase awareness of and appreciation for the Refuge’s cultural resources among refuge users, the community, and staff.
Strategies Applied to Achieve Objective
Prepare interpretive media (e.g., pamphlets, signs, exhibits) that communicate cultural resources information and Native American perspectives to visitors.
Develop interpretive media (e.g., pamphlets, signs, exhibits) that describes the history of Euro-American settlement and use of the Refuge.
Prepare environmental/cultural education materials for use by local schools concerning cultural resources, the discipline of archaeology, the perspectives of Native Americans, the history of the area, and conservation of natural and cultural resources. These materials could include an artifact replica kit with hands-on activities and curriculum prepared in consultation with the local school district, the historical society, and the Tribe.
Consult with the Tribe and other preservation partners to identify the type of cultural resources information appropriate for public interpretation.
Develop an outreach program and materials so that the cultural resource messages become part of cultural events in the area, including the State’s Archaeology Month, National Wildlife Refuge Week, and local festivals (see Objective 7c).
Develop museum property inventory for the George Benson Memorial Museum. Create storage and use plans for museum property as part of the outreach program.
Promote reuse of existing historic structures (e.g., for environmental education, interpretive programs, storage).
Develop and implement interpretive plans for the Headquarters CCC site, Sod House Ranch, Benson Pond CCC site, P Ranch, and Double-O Ranch.
Continue working with the Tribe on the collection of native plant materials where compatible.
Rationale: Cultural resources are not renewable. Interpretation of cultural resources can raise public interest and appreciation for the peoples who lived in earlier times. Ultimately, such appreciation can result in public support for conservation, maintenance, and protection of archaeological and historic sites.

Objective 10c. Consultation on Cultural Resources
Increase coordination and consultation with the Burns Paiute Tribe for prehistoric resources and important native plants and wildlife on the Refuge.

Strategies Applied to Achieve Objective
Continue consulting and coordinating with the Tribe on refuge projects that may affect prehistoric sites, native plants, or wildlife important to the Tribe. Meet with the Tribal Council at least three times a year to review upcoming refuge projects.
Continue working with the Burns Paiute Tribe on the collection of native plant materials where compatible and the inclusion of important traditional plants in riparian or other habitat restoration projects.
Rationale: Federal historic preservation laws and regulations require the Service to consult with Native American Tribes concerning projects which may affect archaeological sites. Collaborating with the Tribe on the inclusion of important traditional plants in refuge restoration projects ensures greater communication with the Tribe.

Objective 10d. Establish Site Significance Factors
Identify criteria that allow us to determine what cultural resource sites, site types, and data from sites are important and need preservation or analysis to address specific research questions.
Strategies Applied to Achieve Objective
Develop a model identifying the sensitivity of various habitat types for the presence of cultural resources. Link these to specific layers in a GIS database.
Perform an archaeological analysis of the Refuge and the surrounding area to formulate a short list of information and research needs for cultural resources and their management.
Rationale: Implementation of this objective will streamline the process used to identify cultural resources that may be impacted by refuge projects or public uses.

GOAL 11. Identify and protect prehistoric and historic resources on the Refuge that are eligible for or listed on the National Register of Historic Places.

Objective 11a. Increase Management Efforts for Historic Sites Listed on or Eligible for Listing on the NRHP
Identify, stabilize, and restore eligible historic resources from the homestead, ranching, and CCC eras.
Strategies Applied to Achieve Objective
Perform an inventory and assessment of historic sites to determine NRHP eligibility. As part of this inventory, identify specific stabilization and restoration costs. This should include prioritization of the most critical needs for each site and structure.
Develop partnerships (University of Oregon, National Park Service, etc.) to assist in the stabilization and restoration of historic sites and structures.
Rationale: Federal historic preservation laws and regulations require a determination of eligibility for the NRHP for sites 50 years or older, and preservation of historic resources determined to be eligible for listing.

Objective 11b. Increase Management Efforts for Prehistoric Sites Listed on or Eligible for Listing on the NRHP
Identify and protect prehistoric archaeological sites listed on or eligible for listing on the NRHP.
Strategies Applied to Achieve Objective
Identify archaeological sites that coincide with existing and planned roads, facilities, public use areas, and habitat projects. Evaluate threatened and impacted sites for eligibility to the NRHP. Prepare and implement activities to mitigate impacts to sites as necessary.
Implement a program to evaluate eligibility to the NRHP for those archaeological sites that may be impacted by Service undertakings, management activities, erosion, or neglect.
Develop a GIS layer for cultural resources that can be used with other GIS layers for the Refuge yet contains appropriate locks to protect sensitive information.
Rationale: Federal historic preservation laws and regulations require a determination of eligibility for the NRHP for archaeological sites 50 years or older.

GOAL 12. Manage the Refuge’s paleontological resources for their educational and scientific values for the benefit of present and future generations of refuge users.

Objective 12a. Protect Paleontological Resources
Increase monitoring and protection of paleontological resources on the Refuge.
Strategies Applied to Achieve Objective
Continue to identify paleontological sites that coincide with existing and planned roads, facilities, public use areas, habitat restoration, and research projects. Prepare and implement activities to mitigate impacts to sites as necessary.
Rationale: Paleontological resources are not renewable. Federal laws and regulations mandate protection of this resource on Federal lands.

Objective 12b. Provide Interpretation of Paleontological Resources
Provide interpretation to instill appreciation for the Refuge’s paleontological resources and the valuable information they can yield about past environments.
Strategies Applied to Achieve Objective
Provide interpretation of paleontological resources at Refuge Headquarters using static displays, brochures, etc.
Partner with National Park Service staff from the John Day Fossil Beds National Monument on the development of interpretive and educational materials about the Refuge’s paleontological resources.
Rationale: Interpretation of paleontological resources can raise public interest and appreciation of the scientific information that can be gained from studies of fossil fauna and flora and how this information relates to

past environments in the Great Basin. Ultimately, such appreciation can result in public support for conservation, maintenance, and protection of paleontological resources.

GOAL 13. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

Objective 13a. Inventory and Monitoring (Surveys)

Throughout the life of the CCP, conduct high-priority inventory and monitoring (survey) activities that evaluate resource management and public use activities to facilitate adaptive management. Surveys should contribute to the enhancement, protection, use, preservation, and management of wildlife populations and their habitats on and off refuge lands. Additionally, surveys can be used to evaluate achievement of resource management objectives identified in the CCP. These surveys have the following attributes:

- Data collection techniques should result in minimal animal mortality or disturbance, and minimal habitat destruction
- The minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, vertebrates) to meet statistical analysis requirements will be collected for identification and/or experimentation in order to minimize long-term or cumulative impacts
- All common carp will be lethally sampled unless the survey pertains to telemetry or mark and recapture.
- Proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary, will minimize the potential spread or introduction of invasive species
- Projects will adhere to scientifically defensible protocols for data collection, where available and applicable

Strategies Applied to Achieve Objective

The following is a list of survey activities to support resource management decisions on the Refuge.

Aquatic inventory and monitoring associated with highest priority habitat objectives.

Terrestrial inventory and monitoring associated with highest priority habitat objectives.

Wildlife inventory and monitoring associated with highest priority habitat objectives.

Habitat inventory and monitoring associated with highest priority habitat objectives.

Rationale:

National Wildlife Refuge System Administration Act of 1966, as amended ([16 U.S.C. 668dd-ee](#)) requires the Service to “monitor the status and trends of fish, wildlife, and plants in each refuge.” Surveys will be used primarily to evaluate resource response to assess progress toward achieving refuge management objectives (under Goals 1-4 in this CCP) derived from the NWRS mission, refuge purpose(s), and maintenance of biological integrity, diversity, and environmental health ([601 FW 3](#)). Determining resource status and evaluating progress toward achieving objectives is essential to implementing adaptive management on Department of Interior lands as required by policy ([522 DM 1](#)). Specifically, results of the surveys will be used to refine management strategies, where necessary, over time in order to achieve resource objectives. Surveys will provide the best available scientific information to promote transparent decision-making processes for resource management over time on refuge lands.

<p>Objective 13b. Assessment of Hydrological Features Associated with Riverine Systems and Associated Wetlands (i.e., Blitzen River)</p>
<p>Conduct geomorphological, hydrological, and biological assessments that will provide current baseline information about the ecological status of riverine systems (i.e., Blitzen River and tributaries) and associated wetlands.</p>
<p>Strategies Applied to Achieve Objective</p>
<p>Historic channel/floodplain geometry (e.g., historic aerial photo analysis, transport measurements).</p>
<p>Sediment flux (sediment/hydraulic modeling).</p>
<p>Water allocation (water budget, habitat use, and availability surveys).</p>
<p>Life history/habitat needs of aquatic species (population modeling, literature review, aerial photos).</p>
<p>Bank erosion and incision rates (e.g., erosion pins, channel surveys).</p>
<p>Channel morphology surveys (e.g., sediment budget).</p>
<p>Sediment transport measurements (e.g., channel change).</p>
<p>Continued gauging of flows (water supply, potential climate change, channel and floodplain change).</p>
<p>Ongoing aerial photo collection and analysis (bank erosion rates, extent of floodplain inundation).</p>
<p>Riparian plant surveys (composition/distribution of riparian vegetation).</p>
<p>Habitat availability surveys for focal species (condition of in-stream habitat).</p>
<p>Habitat use surveys for focal/invasive species (physical factors affecting aquatic species).</p>
<p>Investigate bed erosion associated with in-stream structures.</p>
<p>Rationale: See Objective 2a.</p>
<p>Objective 13c. Implement Riverine Pilot Projects to Assess River and Wetland Response to Rehabilitation Efforts</p>
<p>Utilizing information gleaned from assessment results, identify and implement two to five pilot projects to gain greater understanding of plant community and physical responses to rehabilitation efforts of the Blitzen River and associated tributaries, wetlands, and meadows.</p>
<p>Strategies Applied to Achieve Objective</p>
<p>Study response of wetland habitats to the cessation of flood irrigation.</p>
<p>Initiate small in-stream rehabilitation pilot projects in tributaries or reaches of the Blitzen River in response to assessment results.</p>
<p>Rationale: See Objective 2a. The necessity of this objective is dependant upon the outcomes of Objectives 13a and b.</p>
<p>Objective 13d. Research</p>
<p>Throughout the life of the CCP, conduct high-priority research projects that provide the best science for habitat and wildlife management on and off the Refuge. Scientific findings gained through these projects will expand knowledge regarding life-history needs of species and species groups as well as</p>

identify or refine habitat and wildlife management actions. Research also will reduce uncertainty regarding wildlife and habitat responses to refuge management actions in order to achieve desired outcomes reflected in resource management objectives and to facilitate adaptive management. These research projects should exhibit the following attributes:

- Projects will adhere to scientifically defensible protocols for data collection, where available and applicable, in order to develop the best science for resource management
- Data collection techniques should cause minimal animal mortality (except for invasive species) or disturbance and temporary habitat damage
- Investigators should collect the minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, vertebrates) to meet statistical analysis requirements for identification and/or experimentation in order to minimize long-term or cumulative impacts
- All common carp will be lethally sampled unless the research pertains to telemetry or mark and recapture
- Investigator equipment and clothing will be properly cleaned or quarantined, where necessary, to minimize the potential spread or introduction of invasive species
- Permitted research should result in peer-reviewed articles in scientific journals and publications and/or symposiums

The following is a prioritized list of research projects to support resource management decisions on the Refuge.

Conduct research to gather scientific data to further carp control efforts.

Determine management action responses by native fish and wildlife resources.

Identify methods for restoration of crested wheatgrass plantings and cheatgrass-dominated areas to native sagebrush steppe communities.

Monitor the effect of seasonal water table depths on plant communities along hydrological gradients in emergent marsh and wet and dry meadow habitats in select areas.

Identify strategies for diversifying plant communities (e.g., reed canarygrass and other introduced grass monocultures) where appropriate.

Rationale:

Research projects on refuge lands would address a wide range of natural and cultural resource as well as public-use management issues. Examples of research projects include habitat use and life-history requirements for specific species/species groups, practical methods for habitat management and restoration, extent and severity of environmental contaminants, techniques to control or eradicate pest species, effects of climate change on environmental conditions and associated habitat/wildlife response, identification and analyses of paleontological specimens, wilderness character, modeling of wildlife populations, and assessment of responses of habitat/wildlife to disturbance from public uses. Projects may be species-specific or refuge-specific, or they may evaluate the relative contribution of the Refuge to issues and trends at larger landscape level (e.g., ecoregion, region, and flyway, national, international). Like monitoring, results of research projects would expand the best available scientific information and potentially reduce uncertainties to promote transparent decision-making processes for resource management over time on refuge lands. In combination with results of surveys, research would promote adaptive management on refuge lands. Scientific publications resulting from research on refuge lands will help increase the visibility of the NWRS as a leader in the development of the best science for resource conservation and management.

Objective 13e. Scientific Assessments

Throughout the life of the CCP, conduct scientific assessments to provide baseline information to

expand knowledge regarding the status of refuge resources to make better resource management decisions. These scientific assessments will contribute to the development of refuge resource objectives and they will also be used to facilitate habitat restoration through selection of appropriate habitat management strategies based upon site-specific conditions. These scientific assessments should exhibit the following attributes:

- Use of accepted standards, where available, for completion of assessments
- Scale and accuracy of assessments where appropriate for development and implementation of refuge habitat and wildlife management actions

The following is a prioritized list of scientific assessments to support resource management decisions on the Refuge.

Conduct aquatic health assessment of Malheur Lake pertaining to fish, macroinvertebrates, water, and plants.

Assess avian predation on carp.

Assess carp control study areas before and after treatment.

Rationale:

In accordance with policy for implementing adaptive management on refuge lands ([522 DM 1](#)), appropriate and applicable environmental assessments are necessary to determine resource status, promote learning, and evaluate progress toward achieving objectives whenever using adaptive management. These assessments will provide fundamental information about biotic (e.g., vegetation data layer) as well as abiotic processes and conditions (e.g., soils, topography) that are necessary to ensure that implementation of on-the-ground resource management achieve resource management objectives identified under Goals 1-4.

Objective 13f. Monitor Public Use Programs

Monitor public use programs to meet the needs and desires of refuge visitors, and to ensure visitor satisfaction with wildlife-dependent recreational opportunities. The program will use visitor satisfaction surveys or other instruments to help define and evaluate wildlife-dependent recreational opportunities.

Program	Indicator	Method	Frequency	Locations	Partners
Overall use	Visitation numbers	Traffic counters	Checked monthly	Entrances at Headquarters parking area and P Lane	Volunteers
Site visits	Number of visitors at key sites	Door counter, head count and self-registration	Checked monthly	Visitor Center, trail heads, and fishing areas	Volunteers
Facility conditions	Conditions	Visual/site condition form	Checked quarterly	Signs, trails, interpretive panels, etc.	Volunteers
Welcome and orientation	Number of users and user satisfaction	Comment cards	Checked monthly	Visitor Center and key sites	Volunteers
Wildlife observation	Number of users and user	Self-registration	Checked monthly	Visitor Center and key sites	Volunteers

	satisfaction				
Wildlife/ nature photography	Number of users and user satisfaction	Self-registration	Checked monthly	Visitor Center and key sites	Volunteers
Interpretation	Number of users and user satisfaction	Self-registration	Checked monthly	Visitor Center and key sites	Volunteers
Environmental education	Number of users and user satisfaction	Feedback forms	Per scheduled programs	All scheduled programs	
Hunting	Number of users and user satisfaction	Verbal communication	During hunting seasons	All hunt units	
Fishing	Number of users and user satisfaction	Self-registration	Checked monthly	Entrances to fishing areas	Volunteers
Volunteers and partnerships	Number of users and user satisfaction	Feedback forms and verbal communication	End of volunteer tour of duty or opportunity	All volunteers; partners at bi- annual intervals	

Rationale:

Monitoring public use, including the level of visitation, facility condition, and visitor experience, assists in maintaining a quality public use program. Monitoring will provide a tool to evaluate the public use program and assist the Refuge with making needed improvements.

GOAL 14. Integrate our conservation-based mission with the best available science and become a leader in advancing best practices for the design and management of innovative, sustainable refuge and community development opportunities.

Objective 14a. By 2020, Achieve Carbon Neutrality (striving for carbon negative), Meeting and Exceeding All Energy and Material Efficiency and Effectiveness as Defined by [565 FW 1](#) and [Executive Order 13514](#) for All Facets of Refuge Management and Operations

Strategies Applied to Achieve Objective

Establish performance benchmarks within Environmental Management System ([515 DM 4](#)) as the critical first step, then create metrics and benchmarks for all other sustainability-based practices (environmental, social, economic, and community).

Complete audits for energy and material use, carbon footprint, and biomass-based carbon sequestration.

Integrate sustainability-based approaches into partnerships, contracts, and other external stakeholder efforts.

Provide staff and external stakeholder training for sustainability-based principles and practices, social justice/equity, community development, and partnership performance standards.

Develop projects to refit and right-size facilities, infrastructure, and vehicle fleet to maximize energy efficiency and production. Seek funding through Refuge Operations Needs and Deferred Maintenance databases, and other opportunistic and entrepreneurial funding sources.

Rationale:

The word “sustainability” came into common use only in the past 25 years, most formally in 1987 when the Brundtland Commission defined sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

This widely published definition says much about the ethics and responsibility of one generation to the next. Sustainability is how we commonly think in terms of leaving the nation and world a better place for our children and grandchildren, whether in regards to family, land, and finances, or in terms of public land and resources. As such, it is a reinforcement of traditional American values: protection of our natural and cultural resources, self-sufficiency, self-determination, ingenuity, and responsibility. Sustainability-based planning, design, and management practices are essential to the conservation of biodiversity as well as, if not synonymous with, the longevity and resilience of surrounding local communities and landowners, who are possible partners in Refuge sustainability initiatives.

There are numerous policy statements and initiatives that call for integrating sustainability-based principles and practices within the CCP.

- [USFWS Strategic Plan for Climate Change](#), which calls for the Service to become carbon neutral by 2020
- [515 DM 4](#), Environmental Management System (EMS), which gives facilities a systematic way to identify environmental impacts from operational activities and to set facility-specific goals and targets for sustainability; Malheur Refuge is one of 17 USFWS facilities chosen to implement EMS
- [Executive Order 13514](#), Federal Leadership in Environment, Energy, and Economic Performance
- [Executive Order 13423](#), Federal Environmental, Energy, and Transportation Management (codified by Section 748 of the Omnibus Appropriations Act of 2009 ([P.L. 111-8](#))), and Instructions for Implementing the Order)
- Secretary of Interior Salazar’s speech at the UN Conference on Climate Change in Copenhagen, entitled “[New Energy Future: The Role of Public Lands in Clean Energy Production and Carbon Capture](#)”

As such, in the interest of contributing to national security and economic competitiveness through our mission, the Refuge must do its part in producing more energy than it consumes, storing more carbon than it produces, proactively adapting to climate change, and maximizing the delivery of all other ecological services, especially biodiversity and clean water.

The Refuge is taking the approach of the old adage that if we are not part of the solution, then we are part of the problem. If we are part of the problem, then we risk being irrelevant, if not disposable, in the eyes of the general public. Our intent is to lead.

2.6 References

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Chapter 3 Physical Environment

Appendices

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