



Chapter 2 Management Direction

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Chapter 2. Management Direction

2.1 Overview

During development of this CCP, the Service reviewed and considered a variety of local and regional physical and biological resource conditions, as well as social, economic, and organizational aspects important for managing the Refuge. This background information is described more fully in Chapters 3, 4, and 5. As is appropriate for a national wildlife refuge, natural resource considerations were fundamental in designing alternatives. House Report 105-106 accompanying the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) states "...the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first." Toward this end, the refuge planning team reviewed scientific reports and studies to better understand ecosystem trends and the latest scientific recommendations for species and habitats.

Public involvement was an important part of the planning process. Local, State, and Federal agencies, Tribes, and elected officials were contacted by the Refuge Complex planning team to ascertain priorities and problems as perceived by others. In addition to holding a public scoping meeting to explain the process and accept comments and suggestions, the team contacted refuge users, nonprofit groups, and community organizations to ensure their comments and ideas were considered during the development of alternatives. The planning team then developed preliminary management concepts and strategies, which they presented to the public in a planning update and at a public meeting in fall 2011. Based on all of the information gathered and feedback from others through the public involvement process, the Service developed three draft alternatives for the Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) for Bandon Marsh National Wildlife Refuge (USFWS 2012a), which was released in September 2012. Alternative C was selected as the preferred alternative.

The CCP planning team reviewed and evaluated all of the comments received during the 30-day Draft CCP/EA comment period. Alternative C within the DCCP/EA was selected for implementation. In some cases, the management direction has been either clarified or modified based upon public feedback. The details of public participation can be found in Appendix J, Public Involvement, and Table K-2 within Appendix K, Comments Received during Public/Agency Review Period and Service Responses, shows the major changes between the draft and the final CCP.

2.2 Management Directions Considered but Not Developed

Early in the alternatives development process, the planning team considered including the following actions in one or more CCP alternatives. These actions were ultimately eliminated from further consideration in this CCP for the reasons provided.

Separation of Public Uses on Bandon Marsh Unit. The Bandon Marsh Unit has been open 7 days per week since establishment in 1983. All six priority uses are allowed on this unit, and the only restriction is that waterfowl hunting is not permitted on refuge lands that are within Bandon city limits. The proposal was made that the Service close the Bandon Marsh Unit to hunting several days per week and close the other days to wildlife observation, with the intent of separating the uses and eliminating potential for conflict. Because these uses are separated in time and location by the primary wildlife species being observed or pursued (spring and early fall for shorebird observation;

winter for waterfowl hunting), there have been no reported conflicts to date. The lack of conflicts between the uses and the low potential for development of these conflicts in the future led the Service to remove the option of separating public uses on the Bandon Marsh Unit from further consideration as an alternative. The Service will continue to evaluate and monitor for user conflicts on this unit and will adjust management accordingly.

Substantial Participation in a Community-based Visitor Center. During the public scoping process the Service received comments from the public, the City of Bandon, and the Port of Bandon regarding the development of a community-based visitor center. The City of Bandon proposed the construction and management of an “ecotourism center” on the city-owned property that was the former location of the Bandon Cheese Factory. The property is currently a graveled lot with no structures on it. Specifically it was requested that the Service partner with the City of Bandon to build a visitor center that would be staffed jointly by Service and City personnel and volunteers. The property is directly adjacent to U.S. Highway 101, is in a high traffic area adjacent to small businesses or residential homes, and is bordered by a highly modified (e.g., concrete walled) tributary to the Coquille River. This property does not provide a quality opportunity for visitors to experience nature and wildlife outside of a vehicle, and it does not meet the Service’s criteria for a USFWS-funded wildlife-oriented visitor contact station; therefore this concept was not developed as an alternative. The Port of Bandon additionally discussed the potential of a natural resources-based visitor center at a building and location west of the boat basin and adjacent to the Coquille River. This location provides many opportunities for visitors to view riverine habitat, distant views of Bandon Marsh NWR and wildlife using the Coquille River. The existing warehouse building onsite is in need of substantial modification to provide public facilities.

In the future, if the City or Port of Bandon were to construct an “ecotourism” or natural resource-based visitor center, the USFWS could assist these local government agencies in creating high quality interpretive materials and displays. These interpretive materials would assist the Refuge in educating visitors to the Bandon area about the sensitivity of the wildlife and habitats of Bandon Marsh and Oregon Islands NWRs.

2.3 Description of Management Direction

A brief description of the management direction follows. Table 2-1 contains additional details regarding actions associated with the CCP. A map displaying management direction for the Refuge is located at the end of this chapter (Figure 2-1).

Wildlife and Habitat Management. Refuge management actions will continue to emphasize protecting and maintaining estuarine, stream-riparian, and forested habitats; however, an increased level of active habitat management, monitoring, and restoration will also be implemented. Approximately 29 acres of grasslands (former pastures) will be restored to upland forest, and 11 acres of forested wetlands will continue to be restored. While the Service will primarily allow natural processes to drive vegetative changes, additional techniques such as thinning, girdling, and falling will be used to promote the development of late-successional characteristics within 39 acres of existing forest. Inventory, monitoring, and research programs will be expanded.

Public Use Management. Wildlife observation and photography will remain open on the Bandon Marsh Unit 7 days per week. The viewing deck and marsh trail at the Ni-les’tun Unit will be open

daily. In addition, a portion of the Ni-les'tun Unit will be open to wildlife observation and photography daily except during the waterfowl hunting season.

Waterfowl hunting will continue to be allowed 7 days per week on 256 acres of the Bandon Marsh Unit outside of the Bandon city limits. Additionally, hunting will be allowed on 299 acres of the Ni-les'tun Unit 3 days per week. Artificial fly and lure fishing for cutthroat trout only, in accordance with State and refuge regulations, will be permitted on the tidal portions of Fahys, No Name, and Redd Creeks south of North Bank Lane. The start of the fishing season will coincide with ODFW's season for trout fishing; however, the fishing season on the Refuge will end on September 30 to avoid conflicts with the waterfowl hunting season. Clamming will continue to be allowed on the Bandon Marsh Unit and opportunities to provide clamming will be explored on the Ni-les'tun Unit.

Environmental education and interpretation efforts will be expanded. Partners will take the lead on developing an environmental education center and work with the Service to develop curriculum. Interpretive signs and materials will be developed and added.

Additional parking lots and trails will be constructed to facilitate these public uses. Some administrative and visitor facilities will be replaced. The Service will partner with local government agencies and non-governmental organizations to create interpretive materials and displays for off-refuge ecotourism or natural resource-based visitor centers.

Adaptive Management. Adaptive management is a management philosophy and decision process that incorporates flexibility and continual learning. It involves monitoring and evaluation of refuge accomplishments, comparing accomplishments to objectives, and changing management strategies or objectives as necessary to achieve desired results. In the presence of accelerated climate change, adaptive management is an increasingly important management-decision process. The Refuge will employ adaptive management as a standard operating procedure.

Appropriateness and Compatibility. Consistent with relevant laws, regulations, and policies, prior to allowing any public use of the Refuge (including commercial use), each use will first need to be found appropriate and determined compatible (16 U.S.C. 668dd-668ee, 50 CFR 25, 26, and 29; and 603 FW 1 and 2). In the Draft CCP/EA, the Service made preliminary findings and determinations regarding the appropriateness and compatibility of each use included in each alternative. Appropriateness findings and compatibility determinations have been finalized for each use included in the management direction. Appropriateness and compatibility are further discussed in Appendix B.

Climate Change. As stated in the Department of the Interior's Secretarial Order 3226 and the Service's Climate Change Strategic Plan (USFWS 2010a), the Service considers and analyzes climate change in its decisions, long-range plans and other activities. Habitat conditions and wildlife populations are directly and indirectly sensitive to climatic conditions, namely precipitation and temperature and changes to hydrologic conditions, sea level rise and ocean acidification. As described in greater detail in Chapter 3, the Refuge is currently not affected by sea level rise due to upward vertical land movement and estimated sediment accretion rates. However, the Refuge may be affected by storm surges, increases in extreme precipitation events, higher water temperatures, and ocean acidification.

The combined changes can affect the Refuge's habitats and species directly, such as the timing of arrival of migratory birds and many other phenologic responses, changes in species' ranges and physiology, and indirectly such as added vulnerability to other stressors including increasing invasive

species and pathogens. Predicting biological response at the population level, however, requires complex research and information and sophisticated models that can be validated with field studies over time. This highlights the importance of monitoring habitat and species to establish potential correlations and adaptation options.

Knowledge and monitoring of regional and local climate trends on refuge resources will be used to assess potential changes or enhancements to the Refuge's management actions and techniques and/or their timing, using the adaptive management approach described above.

The Refuge Complex staff will participate in and contribute to climate change and sea level rise assessment efforts, including those underway at a landscape scale. Participation in the North Pacific Coast Landscape Conservation Cooperative (LCC) will provide refuge staff with a means to tie in with a larger scale assessment of the impacts of climate change (USFWS 2010a). LCCs are formal science-management partnerships between the Service, Federal agencies, states, tribes, non-government organizations (NGOs), universities, and other entities to address climate change and other biological stressors in an integrated fashion. LCCs provide science support, biological planning, conservation design, research, and design of inventory and monitoring programs.

As needed, objectives and strategies will be adjusted to assist in enhancing the resiliency of refuge resources to climate change. Specific management goals, objectives and strategies, based on climate change impact projections, will be identified for refuge habitats most vulnerable to climate change and sea level rise.

The Service has developed a Strategic Plan for Responding to Accelerating Climate Change in the 21st Century (USFWS 2010a), and an Action Plan outlining specific actions needed to implement the Strategic Plan. The Action Plan calls for the Service to make its operations carbon-neutral by 2020. The Refuge will work toward this goal by continuing to pursue and engage in mechanisms to conserve energy in refuge operations, including the use of fuel-efficient vehicles and building appropriately sized, energy-efficient facilities, as funding becomes available. The Refuge will also reduce the carbon footprint of land management activities by using energy-efficient techniques, where feasible and in line with management goals. The Refuge will also explore ways of offsetting any remaining carbon balance, such as carbon sequestration through reforesting the upland grasslands and other means.

Cultural Resources Protection. The Service will continue to uphold Federal laws protecting cultural resources, including the National Historic Preservation Act (NHPA), Archaeological Resources Protection Act (ARPA), and Native American Graves Protection and Repatriation Act (NAGPRA). These laws also mandate consultation with Native American tribes, the State Historic Preservation Office (SHPO), and other preservation partners. The NHPA mandates that all projects that use federal funding, permitting, or licensing be reviewed by a cultural resource professional to determine if there is the potential to affect cultural resources. An inventory will be conducted as necessary, and appropriate actions to mitigate effects will be identified prior to implementation of the project. A project-specific determination will be conducted for all undertakings as defined by NHPA, including habitat maintenance and restoration projects as well as new or expanded trails, roads, facilities, and public use areas.

Fire Management. The overall objective for fire management on the Complex is to promote a program that provides for firefighter and public safety, reduces the occurrence of human-caused fires, and ensures appropriate suppression response capability to meet expected wildland fire complexity.

Fire Management Plans (FMPs) were completed for the entire Complex, including Bandon Marsh Refuge, in 2004. The FMP details response to the threat of wildfire and under what circumstances the refuges will use wildland fire as a tool on refuge lands.

Implementation Subject to Funding Availability. Actions described in this CCP will be implemented over the life of the plan as funding becomes available. Project priorities and projected staffing/funding needs are included in Appendix C.

Integrated Pest Management (IPM). In accordance with 517 Departmental Manual (DM) 1 and 569 Fish and Wildlife Service Manual (FW) 1, an integrated pest management (IPM) approach will be utilized, 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 would 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) and as provided in regulations, orders, or permits issued by USEPA may be applied on lands and waters under refuge jurisdiction.

Appendix G contains the Refuge's IPM program documentation to manage pests for this CCP. 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 best management practices (BMPs) for habitat management as well as facilities maintenance will be approved for use on refuge lands where there likely would be only minor, temporary, and localized effects to species and environmental quality based upon non-exceedance of threshold values in Chemical Profiles. However, pesticides may be used on refuge lands where substantial effects to species and the environment are possible (exceed threshold values) in order to protect human health and safety (e.g., mosquito-borne disease).

Because invasive plants and animals currently represent the greatest threat to the Refuge's wildlife and habitat, control of invasive species will be a high priority management activity. Invasive species such as gorse, Himalayan blackberry, reed canarygrass and Scotch broom will continue to be a primary management concern and will be controlled to the degree that funding permits. Invasive species control will be initiated prior to or concurrently with habitat restoration efforts.

The magnitude of pest problems on the Refuge is beyond the available capital resources to expect control or eradication during any single field season; therefore it is essential to prioritize treatment of infestations. Some non-native species which are pervasive on refuge lands are the subject of long-term control efforts and will continue to be a high priority. Also, the Service will find and verify the identity of new invasive species as early after entry as possible, when eradication and control are still feasible and less costly. Regardless of whether the invasive species is well established or newly introduced, the Refuge will prioritize pre- and post-treatment monitoring, assessment of the

successes and failures of treatments and development of new approaches when proposed methods do not achieve desired outcomes.

Land Protection. The Service has the authority to acquire land or negotiate agreements on behalf of the National Wildlife Refuge System only within an approved refuge boundary. The Service can make offers to purchase land, purchase conservation easements or enter into management agreements with willing landowners within the approved boundary. Lands or interests therein, do not become part of the National Wildlife Refuge System unless they are purchased from or are placed under a management agreement with the individual landowner. Service authority over any use of lands within an approved refuge boundary is limited to lands the Service has acquired in fee title, conservation easement or entered into a management agreement. Private landowners within an approved refuge boundary retain all of the rights, privileges, and responsibilities of private land ownership and are under no obligation to sell their property to the Service. Service policy for land acquisition is to work on a one-on-one basis with a willing seller/interested landowner. Based on the availability of funds, the Service will continue to negotiate with willing sellers to acquire lands within the existing approved refuge boundary.

The Service is conducting a separate Land Protection Planning (LPP) process to study options for expanding the approved refuge boundary adjacent to and upstream from the existing boundary. Thus, the question of whether the approved refuge boundary should be expanded is outside of the scope of the CCP (See also Section 1.9.3, Issues outside the Scope of the CCP).

Maintenance of Existing Facilities. Periodic maintenance of refuge buildings and facilities will be necessary. Periodic maintenance and upgrading of facilities is necessary for safety and accessibility and to support management and visitor needs, and is incorporated in the Service Asset Management System.

Regulatory Compliance. Prior to implementation, all planned activities will undergo appropriate reviews and consultations, and permits and clearances will be secured, as necessary, to comply with legal and policy requirements. This includes water quality permits required under section 401, and dredge and fill permits required under section 404 of the Federal Water Pollution Control Act of 1982, as amended (33 U.S.C. 1251-1382); appropriate evaluations and documentation under the National Environmental Policy Act; and, as noted above, evaluation and consultation required by Section 7 of the Endangered Species Act, and review and consultation required by Section 106 of the National Historic Preservation Act.

Response to Mosquito-borne Diseases. Under draft refuge policy (72 FR 71939), mosquito populations on refuge lands are allowed to fluctuate and function unimpeded unless they pose a threat to wildlife and/or human health. While the Service recognizes that mosquitoes are a natural component of most wetland ecosystems which provide food for some fish and wildlife including migratory birds, we also recognize they can be a nuisance and may represent a threat to human and/or wildlife health. To protect human and wildlife health and safety, the state or a local vector control agency would be allowed to control mosquito populations on refuge lands using pesticide treatments (larvicides, pupacides, or adulticides) only if local, current population monitoring and/or disease surveillance data indicate refuge-based mosquitoes pose a health threat to humans and/or wildlife. As previously described, mosquito treatments would be allowed on refuge lands in accordance with IPM principles applicable to all pests (see Appendix G). Proposed pesticide uses for mosquito control will utilize appropriate and practical BMPs, where possible, given potential effects documented in Chemical Profiles. If mosquitoes are determined to be posing a threat to wildlife

and/or human health, a refuge compatibility determination (CD) will be written, which will provide details regarding mosquito population monitoring, disease surveillance, and treatments.

After approval of the CCP, a disease contingency plan (DCP) will be prepared addressing response to mosquito-borne disease outbreaks on and/or adjacent to refuge lands. Much of the information will be evaluated and described in the previously mentioned CD (e.g., IPM treatment options) and will be incorporated with additional specificity, where necessary, into this plan. The DCP also will include other information such as the history of mosquito-borne diseases on and/or adjacent to the Refuge as well as measures to protect refuge visitors, Service authorized agents and Service employees when a health threat or emergency is identified by health officials.

Participation in Regional Planning and Conservation Efforts. The Refuge Complex staff will actively participate in and contribute to planning and conservation efforts for ongoing and future monitoring and research associated with tidal marsh restoration, invasive species detection and rapid response, and other activities that may affect refuge wildlife resources and habitats. Refuge Complex staff will cultivate working relationships with pertinent local, county, State, and Federal agencies to stay abreast of current and potential developments; and will utilize outreach, education, and information as needed to raise awareness of refuge resources and their dependence on a healthy local environment.

Partnerships. Partnerships on the Refuge are critical components in maintaining and continuing efforts to implement resource management improvements, such as restoring habitat for threatened and endangered species or enhance recreation opportunities. These partnerships typically involve joining forces with Federal, state, and local agencies and organizations. The Service will continue to devote time and effort towards maintaining existing and developing new partnerships to enhance collaboration on support of fish and wildlife resources, wildlife-dependent recreational opportunities, and educational programs, and to explore ways to share funding and seek grants on projects of mutual interest. Specifically, the Service will work with local and state agencies to promote mutual understanding, encourage environmentally friendly development, and promote ecotourism opportunities.

Refuge Revenue Sharing. Annual payments to Coos County under the Refuge Revenue Sharing Act (16 U.S.C. 715s) will continue according to the established formula and subject to congressional appropriations.

State Coordination. The Refuge Complex will continue to coordinate with Oregon State agencies regarding areas of mutual interest. This includes communications with ODFW regarding public recreation, fish passage, and habitat restoration and management priorities identified through the Oregon Conservation Strategy.

Tribal Coordination. The Service will coordinate and consult with Native American Tribes on a regular basis regarding issues of shared interest. Currently the Service seeks assistance from Tribes in Native American Graves Protection and Repatriation Act and National Historic Preservation Act and related issues. The Service is also interested in partnering with Tribes to provide cultural resources education and interpretation opportunities.

Volunteer Opportunities and Partnerships. Volunteer opportunities and partnerships are recognized as key components of the successful management of public lands and vital to implementation of refuge programs, plans, and projects.

Wilderness Review. The Service’s CCP policy requires that a wilderness review be completed for all CCPs. If it is determined that the potential for wilderness designation is found, the process moves on to the wilderness study phase. As part of the process for this CCP, the planning team completed a wilderness review, which can be found in Appendix D. This review concluded that the Refuge is not suitable for wilderness designation.

Table 2-1. Summary of Management Direction

Key Theme/issue	Future Management
Upland Forest Habitat	
Restoration of grasslands (former pastures) to forest	29 acres restored. Manage to accelerate restoration to old-growth forest, including control of invasive species, understory establishment, placement of nurse logs.
Management of existing forest	39 acres actively managed. Continue control of invasive species. Use appropriate forest management techniques (e.g., girdling, falling) to thin trees using multiple entry approach, where needed.
Forested Wetlands and Stream-Riparian Habitat	
Forested wetlands and stream-riparian habitat (wet-mesic Sitka spruce-western hemlock forest)	79 acres of forested wetlands protected and maintained. Continue invasive species control.
	11 acres restored. Import and place nurse logs. Control invasive species. Control grasses with mechanical/mowing and herbicides to protect establishing trees/shrubs. Mechanical removal to thin trees, as needed.
Coastal stream-riparian corridor	0.5 mile protected and maintained. Control invasive species. Install logs, woody debris, and root wads in channels to promote diverse hydrological and physical structure. Remove fish passage barriers.
Estuarine Habitat	
Salt marsh and intertidal mudflats	Protect and maintain integrity of 750 acres of estuarine habitats through monitoring for presence of invasive species, salmonid use (woody debris installations), vegetation response, invertebrates, water quality parameters, biofilm/algae abundance and composition, and water quality.
Monitoring and Research	
Status monitoring	Continue and expand existing data collection. Collect additional data on fish, amphibians, small mammals, plants, migratory songbirds, water quality, and forest diseases and pests.
Effectiveness monitoring	Monitor CCP and other step-down plan objectives.
Research and scientific assessments	Continue existing research. Identify priority and long-term research needs and cooperate with partners to accomplish. Complete water resource assessment for the Refuge.
Hunting	
Bandon Marsh Unit	Waterfowl hunting allowed on 256 acres at Bandon Marsh Unit outside of Bandon City Limits 7 days per week per ODFW regulations.
Ni-les’tun Unit	Allow waterfowl hunting on 299 acres of Ni-les’tun Unit 3 days per week.
Wildlife Observation and Photography	
Wildlife observation and photography – Bandon Marsh Unit	Bandon Marsh Unit remains open 7 days per week.
Wildlife observation and photography – Ni-les’tun Unit	Viewing deck and marsh trail open daily. Allow unrestricted walking on part of the Unit daily during non-hunting season (Feb.–Sept.). To avoid conflicts between visitors participating in waterfowl hunting and

Table 2-1. Summary of Management Direction

Key Theme/issue	Future Management
	those engaged in wildlife observation or photography, the Ni-les'tun Unit will be closed to unrestricted walking from Oct. 1 through Jan. 31 annually, which coincides with the waterfowl hunting season. Develop trail connecting restored forest above office with parking lot.
Fishing	
Fishing and clamming – Bandon Marsh Unit	Allowed per ODFW regulations and subject to Oregon Department of Agriculture (ODA) and ODFW shellfish safety closures.
Fishing and clamming – Ni-les'tun Unit	Allow artificial fly and lure fishing for cutthroat trout only, in accordance with refuge and ODFW regulations regarding allowable methods, on the tidal portions of Fahys, No Name, and Redd Creeks on the Ni-les'tun Unit. Fishing season closes on Sept. 30. Explore options for providing clamming opportunities.
Interpretation	
Interpretation	Maintain existing interpretive structures and panels on both units. Develop interpretive panels on new trail system. Offer staff- or partner-led activities (e.g., walks and paddle trips, community-based offsite programs).
Environmental Education	
Environmental education (EE) programs	Partners take lead on developing EE center and work with Service to develop curriculum. Continue existing EE programs.
Facilities	
Facilities	Build a small administrative office and a visitor contact station at current office site. Maintain existing and develop new trails and interpretive panels. Participate in a community-based visitor information center off the Refuge. Utilize habitat-appropriate native plants for landscaping around buildings, kiosks, and other public use facilities.
Climate Change Adaptation	
Reduce carbon footprint	Replace current vehicles with more fuel-efficient vehicles. Any new or replaced facilities will be appropriately sized and energy-efficient. Use energy-efficient land management techniques where feasible and in line with management goals. Explore ways of offsetting carbon balance, such as carbon sequestration.

2.4 Goals, Objectives, and Strategies

Goals and objectives are the unifying elements of successful refuge management. They focus and describe management priorities and actions that resolve issues and 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. Public use and wildlife/habitat management 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.

The goals for Bandon Marsh NWR over the next 15 years under the CCP are presented on the following pages. The goal order does not imply any priority. Each goal is followed by the objectives that pertain to that goal. Some objectives pertain to multiple goals and have simply been placed in the most appropriate location. Similarly, some strategies pertain to multiple objectives. The timeframe

for accomplishing CCP objectives is the 15-year life of the CCP, unless otherwise specified in the objective.

Readers, please note the following:

Below each objective statement are the strategies that could be employed in order to accomplish the objectives. Symbols used in the following tables include:

- % percent sign
- > greater than
- < less than

2.4.1 Goal 1: Restore, protect, and maintain upland forests characteristic of the North Pacific Coastal Ecosystem.

Objective 1.1 Restore Sitka spruce-western hemlock forest
<p>Within the next 15 years, restore and then protect and manage 29 acres of Sitka spruce-western hemlock forest on Bandon Marsh NWR for the benefit of migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander). The desired attributes of the restored Sitka spruce-hemlock forest are the following:</p> <ul style="list-style-type: none"> • 60-70% canopy cover of Sitka spruce, western hemlock, Port Orford cedar, and shore pine • 600 square feet/acre density of nurse logs • 25-95% (83% average) cover of a mosaic of native shrubs (e.g., salmonberry, huckleberry, salal), ferns, and herbaceous species (e.g., sedges) in understory • <5% cover of invasive plants (e.g., Himalayan blackberry, gorse, Scotch broom) • No English ivy present
Strategies Applied to Achieve Objective
Management Strategies:
a. Initially, control grasses with mechanical/mowing and herbicides to protect establishing trees/shrubs
b. Import and place nurse logs to create diversity of structure
c. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)
d. Mechanical removal to thin planted trees as needed to promote survival of desired trees/vegetation
e. Promote understory establishment (e.g., plantings) to aid in understory plant diversity
Monitoring Strategies (see also Objective 5.1 Survey):
f. Monitor migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander) to determine distribution and populations
g. Monitor conifers (e.g., Sitka spruce and western hemlock) to determine growth rate, density, canopy cover and DBH
h. Monitor a mosaic of native shrubs (e.g., salmonberry, huckleberry, salal, wax myrtle), ferns, and herbaceous species (e.g., sedges) to determine understory cover
i. Monitor snags to determine density and location

j. Monitor invasive plant species (e.g., Himalayan blackberry, Scotch broom, English ivy) to determine infestation percent and distribution

k. Monitor existing and planted trees and shrubs to determine survival rate

Rationale: The long-term target of this objective is production of late-successional Sitka spruce and western hemlock forest characteristics and restoration of up to 100% of historic extent of this forest type within the Refuge. Numerous definitions of late-successional or old growth forest exist and vary by location and dominant tree species. However, most definitions indicate four important structural components: number and minimum size of large live trees; canopy conditions; number and minimum size of snags; and number and size of downed large woody debris (LWD). Late-successional Sitka spruce-western hemlock forests provide nesting habitat, forage, and shelter to a variety of wildlife species. Migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) use the conifer forests because of the presence of other birds and rodents, bark and wood-boring insects, and conifer seeds. This habitat will also benefit a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander). Much of the late-successional forest has been removed from the Oregon coast due to logging and development.

Over the life of the CCP (15 years), the Service will restore 29 acres of Sitka spruce-western hemlock forest and set the course towards late-successional or old growth forest characteristics. Nurse logs will remain on-site to create diversity of structure and help establish organic material from decaying woody debris and promote young tree growth and survival. Tree thinning will be accomplished as needed, based upon the survival of planted trees. Grasses will be controlled during the initial phase of restoration to promote survival of Sitka spruce, western hemlock, Port Orford cedar, and shore pine trees. Understory establishment (e.g., plantings) will be promoted and aid in understory plant diversity. In addition, invasive plant species will be controlled using appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means as not to compete with desired tree and shrub species.

Objective 1.2 Protect and maintain Sitka spruce-western hemlock forest

Throughout the life of the CCP, protect and maintain 39 acres of Sitka spruce-western hemlock forest on Bandon Marsh NWR for the benefit of migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander). The desired attributes of this forested habitat are the following:

- 30-95% (73% average) canopy cover of Sitka spruce and western hemlock with DBH 24-36 inches with multiple distinct canopy layers also including grand fir, western red cedar, and/or Port Orford cedar
- 25-95% (83% average) cover of a mosaic of native shrubs (e.g., salmonberry, huckleberry, salal), ferns, and herbaceous species (e.g., sedges) in understory
- Shrub height averages 3 meters (10 feet)
- 600 square feet/acre density of nurse logs
- 6/acre density of snags
- One tree per acre with significant structural defect or decadence (e.g., cavities, broken top, mistletoe or fern infestation)
- <5% cover of invasive plants (e.g., Himalayan blackberry, gorse, Scotch broom)
- <1% English ivy

Strategies Applied to Achieve Objective
Management Strategies:
a. Use appropriate forest management techniques (e.g., girdling, falling) to thin trees using multiple entry approach, where needed
b. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)
Monitoring Strategies (see also Objective 5.1 Survey):
c. Monitor migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and other forest-dependent species (e.g., black-tailed deer, bald eagle, bobcat, Pacific giant salamander) populations to determine distribution and abundance
d. Estimate canopy cover and DBH of Sitka spruce and western hemlock to determine percent cover by species
e. Estimate understory cover of a mosaic of native shrubs (e.g., salmonberry, huckleberry, salal, wax myrtle), ferns, and herbaceous species (e.g., sedges) to determine percent cover by species
f. Monitor snags to determine density and location
g. Monitor invasive plant species (e.g., Himalayan blackberry, Scotch broom, English ivy) to determine percent cover, and location
h. Monitor tree density and thinning efforts to determine areas that need attention
i. Monitor bald eagles to determine distribution, population, and reproductive success
<p>Rationale: The long-term target for this objective is production of late-successional Sitka spruce and western hemlock forest characteristics. Much of this habitat type has been removed from the Oregon coast due to extensive logging and development. See the rationale for Objective 1.1 for a definition of this habitat type and its associated species.</p> <p>The Refuge currently contains 39 acres of Sitka spruce-western hemlock forest. Currently, the forested stands exist on the Ni-les'tun Unit upslope of the Fahys Creek riparian corridor. This refuge habitat benefits migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bald eagle, bobcat, Pacific giant salamander).</p> <p>While this objective emphasizes allowing natural processes (e.g., windfall and natural regeneration in openings) to drive vegetative changes, additional techniques such as thinning, girdling, and falling will also be used to promote the development of late-successional characteristics. Thinning (girdling, falling) trees reduces competition for the resources needed for growth thus promoting larger DBH of late-successional Sitka spruce and western hemlock. Snags are also an important component of a late-successional forest, and tree girdling (strip of bark removed from circumference of trunk) can be used to kill trees and create snags.</p> <p>Maintenance measures, primarily invasive plant control, will be regularly implemented using appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means. Invasive plants compete with desired tree and shrub species, limit native vegetation production, and cause impacts to food, nesting, and cover for wildlife. Controlling and treating invasive species on a consistent basis will allow the Refuge to continue to provide quality habitat to improve fish and wildlife health and survival.</p>

2.4.2 Goal 2: Restore, protect, and maintain forested wetlands and stream-riparian habitat characteristic of the North Pacific Coastal Ecosystem.

<p>Objective 2.1 Protect and maintain wet-mesic Sitka spruce-western hemlock forest</p> <p>Throughout the life of the CCP, protect and maintain 79 acres of wet-mesic Sitka spruce-western hemlock forest and adjacent riparian habitat on Bandon Marsh NWR for the benefit of migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander). The desired attributes of wet-mesic Sitka spruce-western hemlock forest are the following (based on Brophy 2009, Brophy et al. 2011, Brophy and van de Wetering 2012, NatureServe 2012):</p> <ul style="list-style-type: none"> • Periodic freshwater tidal and/or seasonal riparian flooding • Flat topography with local microrelief caused by logs, stumps, and buttressed roots of spruce trees • High organic content of soils (>20% organic matter) • Woody vegetation dominated by native trees and shrubs (e.g., Sitka spruce, red alder, Hooker willow, Sitka willow, twinberry, Pacific crabapple) • Dominant herbaceous species include slough sedge and skunk cabbage with non-wetland species (e.g., salal, huckleberry) growing on fallen logs or spruce root platforms • <5% cover of invasive plants (e.g., blackberry, gorse, Scotch broom) • No English ivy
<p>Strategies Applied to Achieve Objective</p>
<p>Management Strategies:</p> <p>a. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)</p>
<p>Monitoring Strategies (see also Objective 5.1 Survey):</p> <p>b. Monitor migratory landbird (e.g., chestnut-backed chickadee, pileated woodpecker) and other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander) population and use</p> <p>c. Monitor plant community composition (i.e., percent cover of trees, shrubs, ferns, and herbaceous species)</p> <p>d. Determine woody species stem density and basal area</p> <p>e. Monitor salmonids and other fish to determine use and distribution</p> <p>f. Monitor invasive plant species (e.g., Himalayan blackberry, Scotch broom, reed canarygrass, English ivy) to determine abundance and distribution</p> <p>g. Monitor inundation frequency, duration, and depth</p> <p>h. Monitor groundwater input</p> <p>i. Monitor hydrology to determine beaver effects on water flow</p>
<p>Rationale: For the purposes of this CCP, wet-mesic Sitka spruce-western hemlock forests are defined as woody habitats that consist of valley forested wetlands and riparian forest along rivers, salt marsh, or mudflats (e.g., National Vegetation Classification Standard <i>Tsuga heterophylla</i> - <i>Picea sitchensis</i>/<i>Lysichiton americanus</i> Hardwood-Conifer Rich Swamp Group, NatureServe 2012). Periodic freshwater tidal and/or seasonal riparian flooding are the major natural processes that drive this system. Soils are perennially wet, usually with high organic content. Historically, many of the areas located in the lower brackish (mesohaline to oligohaline) and freshwater tidal zones of Oregon’s estuaries were likely Sitka spruce and/or shrub tidal swamp. Tidal swamps were</p>

also found on the margins of the marine salinity zone where freshwater dilutes ocean water, such as along tributary streams, on high natural levees, and in hillslope seepage zones.

Within the Refuge, the 79 acres of wet-mesic Sitka spruce-western hemlock forest and riparian habitat are found along the fringes of the Coquille River, small tributaries of Fahys and Redd creeks, salt marsh and mudflats, with the majority of the acreage being located on the Ni-les'tun Unit. Migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander) are abundant and use the surrounding habitat for hunting, foraging, and resting. Beavers are also abundant in the nearby streams and woodlands and drive the hydrology of the system. This area also provides off-river habitat for salmonids during high waters, including the threatened coho salmon.

Invasive plant species such as Himalayan blackberry, English ivy, and Scotch broom present challenges. Himalayan blackberry readily invades riparian areas, forest edges, oak woodlands, meadows, roadsides, clear-cuts, and any other relatively open area, including all open forest types. Once it becomes well established, it out-competes low stature native vegetation and can prevent establishment of shade intolerant trees, leading to the formation of apparently permanent blackberry thickets with little other vegetation present. Invasive species treatment has been initiated on the Himalayan blackberry that infests much of the refuge uplands, roadsides, and trail edges. English ivy is a vigorous growing vine that impacts all levels of disturbed and undisturbed forested areas, growing both as a ground cover and a climbing vine. As the ivy climbs in search of increased light, it engulfs and kills branches by blocking light from reaching the host tree's leaves. In addition to English ivy, Scotch broom also is being found more frequently on the Refuge. Wherever it grows, this aggressive plant spreads to form pure stands at the expense of desirable forbs, grasses, and young trees. Because it is a threat to native plant species and indirectly to animals that feed on the displaced plants, Scotch broom is a Class B noxious weed in Oregon. Due to lack of funding and staff, to date minimal control efforts have been conducted, and these species continue to invade and spread throughout the Refuge.

Objective 2.2 Restore wet-mesic Sitka spruce-western hemlock forest

By 2027 (within next 15 years), restore, then protect and maintain 11 acres of wet-mesic Sitka spruce-western hemlock forest and riparian habitat on Bandon Marsh NWR for the benefit of migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander). The desired attributes of wet-mesic Sitka spruce-western hemlock forest are the following (based on Brophy 2009, Brophy et al. 2011, Brophy and van de Wetering 2012, NatureServe 2012):

- Periodic freshwater tidal and/or seasonal riparian flooding
- High organic content of soils (>20% organic matter)
- Woody vegetation dominated by native trees and shrubs (e.g., Sitka spruce, red alder, Hooker willow, Sitka willow, twinberry, Pacific crabapple)
- Dominant herbaceous species include slough sedge and skunk cabbage with non-wetland species (e.g., salal, huckleberry) growing on fallen logs or spruce root platforms
- <5% cover of invasive plants (e.g., blackberry, gorse, Scotch broom)
- No English ivy

Strategies Applied to Achieve Objective
Management Strategies:
a. Initially, control grasses with mechanical/mowing and herbicides to protect establishing trees/shrubs
b. Import and place nurse logs to create diversity of structure
c. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)
d. Mechanical removal to thin planted trees as needed to promote survival of desired trees/vegetation
e. Promote understory establishment (e.g., plantings) to aid in understory plant diversity
Monitoring Strategies (see also Objective 5.1 Survey):
f. Monitor migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander) to determine distribution and populations
g. Monitor plant community composition (i.e., percent cover of trees, shrubs, ferns, and herbaceous species)
h. Determine woody species stem density and basal area
i. Monitor invasive plant species (e.g., Himalayan blackberry, Scotch broom, English ivy) to determine infestation percent and distribution
j. Monitor existing and planted trees and shrubs to determine survival rate
k. Monitor salmonids and other fishes to determine use and distribution
l. Monitor hydrology to determine beaver effects on water flow
<p>Rationale: Wet-mesic Sitka spruce-western hemlock forests are defined in the rationale section for Objective 2.1. Historically, the forested wetlands on the Refuge were converted into useable lowland pastures for farming and cattle grazing purposes and for cranberry production. The lowland pastures were restored to tidal action within the Ni-les'tun restoration project, and these lands will be planted and converted back to wet-mesic Sitka spruce-western hemlock forest. The former cranberry bogs (11 acres) were recontoured and hydrologically restored to Fahys Creek and the area planted with a mixture of Sitka spruce and other riparian trees and shrubs (e.g., willows, vine maple, crabapple, twinberry, huckleberry). Strategies are intended to maintain (e.g., water), enhance (e.g., thin trees and control invasives) and connect 11 acres of restored habitat with the existing 79 acres of wet-mesic Sitka spruce-western hemlock forest.</p> <p>Beavers are abundant in the nearby streams and forested wetlands and drive the hydrology of the system. Migratory landbirds (e.g., chestnut-backed chickadee, pileated woodpecker) and a diverse assemblage of other forest-dependent species (e.g., black-tailed deer, bobcat, Pacific giant salamander) are abundant and use the surrounding habitat for foraging, and resting. This area also provides off-river habitat for salmonids during high waters, including the threatened coho salmon.</p> <p>Invasive plant species such as Himalayan blackberry, English ivy, and Scotch broom present the same challenges for this habitat type as discussed in the rationale for Objective 2.1. Invasive species treatment has been initiated on the Himalayan blackberry that infests much of the refuge uplands, roadsides, and trail edges. Scotch broom also is being found more frequently on the newly restored habitat of the Refuge. Some control efforts have been conducted and these species continue to invade and spread throughout the newly restored habitats on the Refuge.</p>

Objective 2.3 Protect and maintain coastal stream-riparian corridor

Throughout the life of the CCP, protect and maintain 0.5 mile of coastal stream-riparian corridor on Bandon Marsh NWR for the benefit of migratory landbirds (e.g., orange-crowned warbler, common yellowthroat), native fishes (e.g., coastal cutthroat trout, coho salmon), amphibians (e.g., northwestern salamander), small mammals (e.g., shrew, deer mouse), and a diverse assemblage of other riparian-dependent species (e.g., beaver). This coastal stream-riparian corridor habitat is characterized by the following attributes:

- 30-95% (73% average) overstory riparian corridor characterized by red alder and willows with fewer Port Orford cedar, Sitka spruce, Douglas fir, and western red cedar
- 25-95% (83% average) understory cover with native shrubs (e.g., huckleberry, salmonberry, twinberry) and sedges
- <5% cover of invasive plants (e.g., Himalayan blackberry, Scotch broom)

Strategies Applied to Achieve Objective

Management Strategies:

a. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)

Monitoring Strategies (see also Objective 5.1 Survey):

b. Monitor migratory landbird (e.g., chestnut-backed chickadee, pileated woodpecker) and other coastal stream-riparian dependent species (e.g., black-tailed deer, bobcat, beaver, Pacific giant salamander) to determine distribution and populations

c. Monitor stream-edge invertebrates to determine species composition and relative abundance

d. Monitor invasive plant and animal species to determine infestation, abundance, and distribution

Rationale: Riparian and wetland forests are highly variable in their composition, size, and structure. Functioning floodplains are influenced by high-flow events that shape stream channels and riparian vegetation through a process of pulse disturbances. The high density of edges contributes to habitat and species diversity and productivity.

The 0.5 mile of stream-riparian corridor on the Refuge benefits migratory landbirds (e.g., orange-crowned warbler, common yellowthroat), native fishes (e.g., coastal cutthroat trout, coho salmon), amphibians (e.g., northwestern salamander), small mammals (e.g., shrew, deer mouse), and a diverse assemblage of other riparian-dependent species (e.g., beaver). This area also provides diversity of low understory habitat for landbirds that provides cover, nesting and foraging areas. For successful production, landbirds that live at the edges of streams or riparian canopy areas depend on the presence of streambank vegetation and abundant invertebrate diversity created by multiple layers of understory and deciduous trees. Large woody debris has been placed in the stream and provides cross-stream corridor and movement habitat which can improve the genetic health and survival of small mammals. Beavers are abundant in the stream and nearby wetland forests and drive the hydrology of the system.

Invasive plant species have been noted within the riparian habitat on the Refuge; however, very limited control efforts have been conducted, and these species continue to spread throughout the riparian corridor. Limiting invasive species will provide quality forage to improve fish and wildlife health and survival. Invasive plant species will be controlled using appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means as not to compete with desired plant species.

2.4.3 Goal 3: Enhance, protect, and maintain estuarine habitats characteristic of the North Pacific Coastal Ecosystem.

<p>Objective 3.1 Enhance, protect, and maintain salt marsh</p> <p>Throughout the life of the CCP, enhance, protect, and maintain 650 acres of salt marsh on Bandon Marsh NWR for the benefit of migratory birds (e.g., American wigeon, northern pintail, mallard, sora, merlin, shorebirds), salmonids (e.g., Chinook and coho salmon, coastal cutthroat trout), and diverse assemblage of other species (e.g., river otter, black-tailed deer). Salt marsh is characterized by the following attributes:</p> <ul style="list-style-type: none"> • Diverse elevations ranging from about 3 feet below mean lower low water (MLLW) to 9 feet above MLLW for tidal flats and tidal marshes • Hydrological flows are affected by high flows in the rivers and tidal cycles • Low elevation areas are a mosaic of native species including salt grass and pickleweed • Upper elevation includes Lyngby’s sedge, slough sedge, tufted hairgrass, Pacific silverweed and occasional Henderson’s checkermallow • Tidal channels are highly branched, sinuous, and deep-sided of different orders with a large woody debris component • Lands completely submerged during high seasonal tidal cycles • No cordgrass species • No nutria or other non-native mammals (e.g., red fox)
<p>Strategies Applied to Achieve Objective</p>
<p>Management Strategies:</p>
<p>a. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)</p>
<p>b. Outplanting of rare, native species (e.g., Henderson’s checkermallow) to increase native vegetation presence</p>
<p>c. Clean and disinfect clothing and boating equipment before and after entering salt marsh</p>
<p>d. Apply public outreach to inform public about invasive or exotic animal species introductions, transport, and control methods</p>
<p>Monitoring Strategies (see also Objective 5.1 Survey):</p>
<p>e. Monitor migratory birds (e.g., savannah sparrow, great blue heron, northern harrier), and other mammal species (e.g., river otter, black-tailed deer) populations to determine distribution and abundance</p>
<p>f. Monitor waterfowl to determine populations and habitat use</p>
<p>g. Monitor salt marsh to determine stop-over (feeding and loafing) and breeding habitat parameters for waterfowl</p>
<p>h. Monitor hydrological flows and tidal elevations/cycles to understand hydrological influence and parameters</p>
<p>i. Survey native plant species (salt grass, pickleweed, Lyngby’s sedge, slough sedge, tufted hairgrass, Pacific silverweed and Henderson’s checkermallow) to determine distribution and density</p>
<p>j. Monitor large woody debris to determine location and composition and vegetation response</p>
<p>k. Monitor salmonids and other estuary-dependent fish species to determine distribution, biological characteristics, and use of woody debris installations</p>
<p>l. Monitor water quality to describe water quality parameters</p>

m. Monitor composition and relative abundance of macro invertebrates to determine abundance and distribution

n. Monitor invasive plant (e.g., cordgrass, reed canarygrass, Himalayan blackberry) and animal species (New Zealand mudsnail, nutria, feral cats) to determine percent cover and location

o. Monitor sedimentation rates and vegetation response within the bay or salt marsh

p. Monitor public use programs (i.e., waterfowl hunting, fishing) to determine impacts and response fish and wildlife

q. Work with partners to monitor environmental factors that are climate change related stressors (e.g., changes to hydrology, acidification, storm intensity, floods)

Rationale: Tidal wetlands are of high ecological importance and are considered essential habitat for many marine and anadromous fish (including threatened coho salmon) and migratory birds (ODFW 2006, Seliskar and Gallagher 1983). Salt marshes provide food and nursery areas for numerous young fish, crabs, shrimp, clams, and other invertebrates. Migratory birds use the salt marsh as a breeding, feeding, and resting site. In addition, the estuarine marshland supports large numbers of migratory waterfowl and shorebirds, which in turn provide an important prey base for the recently delisted bald eagle and the peregrine falcon. The salt marsh is functionally connected with mudflat habitat and riverine habitats and act as a transition zone between aquatic and terrestrial sites. These marshes provide shoreline stability against wave and wind erosion, reduce flood peaks, trap nutrients, sediment, and pollutants. Lyngby’s sedge, slough sedge, tufted hairgrass, Pacific silverweed and Henderson’s checkermallow are native salt marsh species and are often associated with unaltered estuarine habitat in Oregon.

The 650 acres of salt marsh at Bandon Marsh NWR provide critical ecosystems and ecological processes. In Oregon’s seventeen largest estuaries, tidal wetland acreage has declined considerably based on pre-settlement estimates. Brophy (2011), using information from Scranton (2004) and Hawes et al. (2008), estimated 16,173 acres of tidal marsh statewide in the 1850s and by 2005 80% of those acres were no longer tidal marsh. The Coquille has experienced the greatest loss (>95%) of tidal marsh habitat in the state (ibid.).

If unaltered or restored to a more natural hydrologic state (i.e., characterized by sinuous, deeply-incised, and complex tidal channel networks; and the absence of alterations such as ditching, diking, tidegates, restrictive culverts, and roads), salt marsh habitat will maintain itself with very little or no input from land managers. As a result, to accomplish this objective, the Refuge primarily needs to outplant native species and pursue invasive species control. Outplanting of rare, native species, such as Henderson’s checkermallow, is needed to reestablish a healthy population, since this species is nearly absent at Bandon Marsh NWR.

Invasive species degrade habitats that support a diverse community of estuarine organisms including aquatic migratory birds and anadromous fish, and the invertebrate and plant communities that support them. For example, the widespread colonization by cordgrass, which is not currently present on the Refuge, would induce major modifications of physical, hydrological, chemical, and biological estuarine functions. Cordgrass displaces eelgrass on mudflats and native vegetation in salt marshes. This invasive plant must be controlled using IPM techniques including mechanical/physical, chemical, biological, and cultural means.

One of the largest threats to the wildlife and habitat of the Refuge is pest animals. Introduced

native and non-native animal species (New Zealand mudsnail, nutria, feral cats) are usually in direct competition with native wildlife species for food, shelter, and breeding areas and often cause existing native species populations to decline or become extirpated. Ultimately, animal invasive species can result in considerable impact to native wildlife and the habitat they are dependent upon. Limiting invasive and exotic animal species will provide improved quality habitat and wildlife health and survival. Actions will be taken to reduce competition between native and non-native animal species.

Monitoring sedimentation rates and vegetation response within the bay and salt marsh is important to the understanding of the potential resilience of these habitats to sea level rise, storm surges, and flood events.

Objective 3.2 Protect and maintain intertidal mudflats

Throughout the life of the CCP, protect and maintain 100 acres of intertidal mudflats on Bandon Marsh NWR for the benefit of migratory birds (e.g., American wigeon, mallard, western sandpiper, short-billed dowitcher), salmonids (e.g., Chinook and coho salmon, coastal cutthroat trout), shellfish (e.g., sand shrimp, benthic worms, native clams), and diverse assemblage of intertidal mudflat species (e.g., river otter). Intertidal mudflats are characterized by the following attributes:

- Diverse elevations ranging from about 3 feet below MLLW to about 4 feet MLLW that is completely inundated during two daily tidal cycles
- Mosaic of tidal channels of variable orders that can remain inundated depending upon the seasonal tides and elevations
- Sandy/muddy substrate that is sparsely vegetated by widgeon grass and seasonal algae blooms
- Presence of large woody debris
- Presence of biofilm on muddy substrate
- No Japanese eelgrass
- No cordgrass species

Strategies Applied to Achieve Objective

Management Strategies:

a. Utilize appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means (see IPM Appendix)

b. Work with Oregon Division of State Lands to cooperatively manage resources, treat/monitor invasive species

Monitoring Strategies (see also Objective 5.1 Survey):

c. Monitor migratory birds (e.g., American wigeon, mallard, great blue heron, peregrine falcon, western sandpiper, short-billed dowitcher), salmonids (e.g., Chinook, cutthroat, coho), shellfish (e.g., sand shrimp, benthic worms, native clams), and mammal species (e.g., river otter) to determine population and biological characteristics and use of intertidal mudflats

d. Monitor invasive plant species (e.g., Japanese eelgrass, cordgrass) to determine percent cover and location

e. Monitor shorebirds to determine distribution, populations, and habitat use

f. Monitor habitat parameters to determine stop-over feeding and loafing habitat quality for shorebirds

g. Monitor composition and relative abundance of macro invertebrates to determine abundance and distribution
h. Monitor/survey biofilm/algae to determine abundance and composition
i. Monitor sedimentation rates and vegetation response within the bay or intertidal mudflats
j. Monitor water quality on the Refuge to ensure contaminant levels are not exceeded and aquatic resources are protected
k. Monitor large woody debris to determine rate of deposition
l. Work with partners to monitor environmental factors that are climate change related stressors (e.g., changes to hydrology and salinity)
<p>Rationale: The 100 acres of intertidal mudflats are functionally connected with salt marsh and riverine habitats, which contain a rich invertebrate community that supports a diversity of native fishes, shorebirds, and waterfowl. Algae and diatoms are the principal plant types; vascular plants are rare or absent. Invertebrates such as snails, shrimp, clams, worms, and crabs are locally common or abundant. The most common and important non-fish species occupying the mudflats include Dungeness crab, softshell clams, and sand shrimp. Waders such as great blue herons and great egrets, and shorebirds such as least and western sandpiper, dunlin, short and long-billed dowitcher, greater yellowlegs, black-bellied plover, red-necked phalarope, whimbrel, long-billed curlew, and black turnstones make extensive use of the mudflats for foraging on macro-invertebrates and in some cases biofilm. Bandon Marsh provides stop-over habitat for migratory shorebirds and quality habitat to improve wildlife health and survival. Dabbling ducks, diving ducks, gulls, peregrine falcons, and bald eagles also forage there. Harbor seals forage on inundated mudflats at high tide and in the lower bay, or they haul out on the flats and spit to rest. Large woody debris provides perch sites for migratory birds including raptors and waders.</p> <p>Intertidal mudflats tend to maintain their integrity naturally, and managers typically need to conduct very little active management. As a result, to accomplish this objective, the Refuge primarily needs to pursue invasive species control. Invasive species such as Japanese eelgrass and cordgrass are of primary concern; their impacts are discussed in the rationale section for Objective 3.1.</p> <p>Actions will be taken to reduce competition between native and non-native vegetation species. These invasive plants must be controlled using IPM techniques including mechanical/physical, chemical, biological, and cultural means. Since land owned by the state is adjacent to refuge lands, we will work cooperatively with the State of Oregon to control invasive species. Eradication efforts will be attempted on an annual basis on properties within Bandon Marsh NWR to remove and prevent further spread of invasive species.</p> <p>Water quality must also be closely monitored since agricultural lands are nearby and the spread of manure or commercial fertilizer and herbicide is a common practice. If fertilizers or other chemicals enter the water system, they can be deposited within the environment and bio-accumulate in associated organisms.</p> <p>Sedimentation is a natural event that occurs in bays and estuaries and can alter plant communities and hydrology. The rate of sedimentation should be closely monitored and the habitat changes due to sedimentation documented. Monitoring sedimentation rates and vegetation response for</p>

intertidal mudflats is also important to the understanding of the potential resilience of this habitat type to sea level rise, storm surges, and flood events.

2.4.4 Goal 4: Enhance, protect, and maintain instream aquatic habitat for all dependent species including anadromous fish.

Objective 4.1 Enhance, protect, and maintain instream aquatic habitat

Enhance, protect, and maintain instream aquatic habitat within the Refuge throughout the life of the CCP for the benefit of anadromous fish and other estuary-dependent fish common in the lower Coquille River estuary and refuge tributaries including fall Chinook salmon, coho salmon, steelhead, and cutthroat trout. Instream aquatic habitat is characterized by the following attributes:

- Instream and estuary channel presence of woody and organic debris
- Meandering estuary channels and freshwater creeks (e.g., complex and braided) with unimpeded fish access
- Water quality that will meet life-history needs for salmonids (e.g., water temperature 12.8°-17.8°C, dissolved oxygen levels >7.0 milligrams per liter)
- Instream substrate (spawning gravel), <5% cover, pool/riffle ratio suitable for cutthroat trout
- <1% non-native or invasive fish (e.g., smallmouth bass, bluegill) and plants

Strategies Applied to Achieve Objective

Management Strategies:

- a. Installation and maintenance of woody debris (i.e., logs and root wads) in estuary and stream channels for cover
- b. Provide instream spawning gravel (cutthroat trout) habitat
- c. Plant and maintain stream side vegetative cover to reduce water temperatures
- d. Work cooperatively with ODFW and adjacent landowners to address fish passage and water quality issues
- e. Work cooperatively with ODFW and USFWS Fisheries Program to understand, monitor, and control non-native invasive fish (e.g., smallmouth bass, bluegill, bullhead) that are competitive with native fishes

Monitoring Strategies (see also Objective 5.1 Survey):

- f. Monitor salmonids to determine distribution, biological characteristics, and use of woody debris installations
- g. Monitor water quality (e.g., temperature, turbidity, dissolve oxygen, pH, toxins, nutrients, organic loading, dissolved and suspended solids)
- h. Monitor estuary and instream benthic invertebrates to determine species composition, diversity and abundance
- i. Monitor riparian and estuary invasive plant and animal species to determine infestation, abundance, and distribution

Rationale: Protection and enhancement of aquatic habitat is important to anadromous and estuary-dependent fish species. The Coquille River watershed is a productive fishery resource for the state of Oregon. Salmonids common in the lower Coquille River estuary include fall Chinook salmon, coho salmon (threatened species), winter steelhead, and coastal cutthroat trout.

Threats currently facing salmonids and other estuary-dependent fish include the present or

threatened destruction, modification, or curtailment of habitat or range. In many Oregon coastal streams, past human activities (e.g., logging, agriculture, gravel mining, urbanization) have resulted in impediments to fish passage, degradation of stream complexity, increased sedimentation, reduced water quality and quantity, loss and degradation of riparian habitats, and loss and degradation of lowland, estuarine, and wetland salmonid rearing habitats. Most anadromous fish species in the Pacific Northwest have been in decline for decades. Spring Chinook salmon, coho salmon, and coastal cutthroat trout all have depressed populations. Coho salmon on the Oregon Coast are listed as “Threatened” on the federal Threatened and Endangered Species List.

Conserving and restoring salmonid populations is an important goal, not only for their own sake, but also because of their cultural, historical, and ecological value. Salmonids are an important food source for numerous other wildlife species. Sixty-seven wildlife species of the Pacific Northwest, including many known to inhabit the Refuge, have been known to have a “strong” or “recurrent” relationship with salmon (Cederholm et al. 2000).

For successful production, juvenile salmonids that live at the edges of streams or in backwater areas depend on the presence of streambank vegetation and abundant instream structure created by logs and root wads. Large woody debris has been placed at the Ni-les’tun Unit restoration site to provide cover and to increase channel diversity quality, which improves health and survival of estuary-dependent and juvenile salmonids.

To control invasive non-native fish (e.g., smallmouth bass, bluegill) the Refuge is working cooperatively with ODFW and other fisheries biologists to remove and control these species to reduce competition between native and non-native fish species. Invasive plant species have been noted on the Refuge; however, very limited control efforts have been conducted, and these species continue to invade and spread throughout the aquatic habitat. Limiting invasive species will provide quality forage to improve fish health and survival. Invasive plant species will be controlled using appropriate IPM techniques including mechanical/physical, chemical, biological, and cultural means as not to compete with desired plant species.

2.4.5 Goal 5: Research and monitoring. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

Objective 5.1 Conduct 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. These surveys contribute to the enhancement, protection, use, preservation, and management of wildlife populations and their habitats on- and off-refuge lands. Specifically, they can be used to evaluate achievement of resource management objectives identified under Goals 1 through 4 in this CCP. These surveys have the following attributes:

- Data collection techniques will have minimal animal mortality or disturbance and minimal habitat destruction
- Minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, vertebrates) to meet statistical analysis requirements will be collected

<p>for identification and/or experimentation in order to minimize long-term or cumulative impacts</p> <ul style="list-style-type: none"> • 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
<p>Strategies Applied to Achieve Objective</p>
<p>a. Prepare inventory and monitoring plan</p>
<p>b. Early detection and rapid response monitoring to identify new or spreading invasive plant and animal problems</p>
<p>c. Collect data and samples of fish, wildlife, and habitat parameters to determine overall health of the Refuge</p>
<p>d. Utilize scientific survey protocols for data collection to ensure quality results</p>
<p>e. Utilize most recent and up-to-date survey equipment to ensure reliable data are collected</p>
<p>f. Implement management strategies as needed as identified by survey data to maintain biological integrity, diversity, and environmental health</p>
<p>g. Monitor invasive/nuisance plant and animal species in mudflats, salt marsh, uplands, and forested habitats to determine distribution and infestation</p>
<p>h. Monitor forest diseases and pests to determine presence and extent</p>
<p>i. Monitor salmonids to determine distribution, biological characteristics, and use of woody debris</p>
<p>j. Monitor mammals, migratory landbirds, shorebirds, waterfowl, invertebrates, and amphibians to determine populations, distributions, and habitat use</p>
<p>k. Conduct long-term hydrological, biological, and physical monitoring to determine effectiveness of salt marsh restoration projects (e.g., Ni-les'tun Unit)</p>
<p>l. Monitor water quality returning to river and bay to determine pollution levels</p>
<p>m. Conduct periodic soil testing to maintain optimal pH levels and soil condition</p>
<p>n. Monitor habitat parameters including vegetation associated with respective habitat types to determine health of ecosystem</p>
<p>o. Monitor sedimentation rates and vegetation response within the bay or salt marsh</p>
<p>p. Monitor public use programs (i.e., waterfowl hunting) to determine waterfowl impact and response</p>
<p>q. Monitor Sitka spruce and western hemlock to determine growth rate, density, canopy cover and DBH</p>
<p>r. Monitor a mosaic of native shrubs (e.g., salmonberry, huckleberry, salal, wax myrtle), ferns, and herbaceous species (e.g., sedges) to determine understory cover</p>
<p>s. Monitor snags to determine density</p>
<p>t. Monitor invasive plant species (e.g., Himalayan blackberry, Scotch broom, English ivy) to determine infestation percent and distribution</p>
<p>u. Monitor existing and planted trees and shrubs to determine survival rate</p>
<p>v. Monitor tree density and thinning efforts to determine areas that need attention</p>
<p>w. Monitor/survey biofilm/algae to determine abundance and composition</p>
<p>x. Monitor hydrological parameters (e.g., flow regime—timing and magnitude) and associated physical attributes (e.g., water temperature, dissolved oxygen levels) to determine if parameters are</p>

within water quality standards
y. Monitor hydrology to determine beaver effects on water flow
z. Monitor hydrological flows and tidal elevations/cycles to understand hydrological influence and parameters
aa. Monitor wetland native vegetation to determine species composition
bb. Monitor vegetation and wildlife to determine response to IPM techniques
cc. Hire an additional permanent full-time (PFT) Wildlife Biologist to identify survey needs, collect scientific data, and meet the needs of the Refuge's biological program
<p>Rationale: National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-ee) set a requirement 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 through 4) derived from the NWRs Mission, refuge purpose(s), and maintenance of biological integrity, diversity, and environmental health (601 FW 3).</p> <p>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 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> <p>The Service will provide staff to adequately address biological complexity of the Refuge with the goal of hiring an additional Permanent Full Time (PFT) Wildlife Biologist. Currently, the Complex has only one PFT Wildlife Biologist. The Wildlife Biologist will design and implement scientific studies.</p>

Objective 5.2 Conduct research

Throughout the life of the CCP, conduct high-priority research projects that provide the best science for habitat and wildlife management on- and off-refuge. Scientific findings gained through these projects will expand knowledge regarding life-history needs of species and species groups as well as identify or refine habitat and wildlife management actions. Wildlife and habitat responses to refuge management actions will be monitored through research projects; as a result, resource management objectives and adaptive management will be facilitated to achieve desired outcomes. These research projects have the following attributes:

- 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 will have minimal animal mortality or disturbance and minimal habitat destruction
- 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
- Utilize proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary, to minimize the potential spread or introduction of invasive species
- Often result in peer reviewed articles in scientific journals and publications and/or

symposiums
Strategies Applied to Achieve Objective
a. Identify and articulate priority management-oriented research needs to a wide scientific audience
b. Collect data and samples of fish, wildlife, and habitat parameters to meet statistical analysis requirements
c. Utilize scientific survey protocols for data collection to ensure quality results
d. Utilize most recent and up-to-date survey equipment to ensure reliable data are collected
e. Quarantine or clean investigator equipment and clothing to prevent spread of invasive plant and animals
f. Research disturbance of nesting birds to document disturbance type, impacts, and other parameters
g. Research predator prey relationships to document specific parameters and effects to populations
h. Conduct research on salt marshes to determine accretion and subsidence rates
i. Conduct research on the potential effects of climate change and sea level rise on salt marshes
Rationale: Like monitoring, results of research projects will 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 will promote adaptive management on refuge lands. Scientific publications resulting from research on refuge lands will help increase the visibility of the NWRS as leader in the development of the best science for resource conservation and management.
<p>Research projects on refuge lands will address a wide range of natural and cultural resource as well as public-use management issues. Examples of management-oriented 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, modeling of wildlife populations, and assessing response of habitat/wildlife to disturbance from public uses. Projects may be species specific, refuge-specific, or evaluate the relative contribution of the Refuge to larger landscape (e.g., ecoregion, region, flyway, national, international) issues and trends.</p> <p>The findings from two ongoing projects may elicit new fields of inquiry and research, and influence priorities for inventory and monitoring on the Refuge. The Refuge will monitor the results of coastal and marine species climate sensitivity analyses (in progress, Dr. Deborah Reusser, USGS, lead researcher, funded by the North Pacific Landscape Conservation Cooperative) and a North Pacific birds sensitivity analysis (in progress, PRBO-Conservation Science, funded by the North Pacific Landscape Conservation Cooperative).</p>

Objective 5.3 Conduct scientific assessments

Throughout the life of the CCP, conduct scientific assessments to provide baseline information that will expand our knowledge regarding the status of refuge resources and better inform resource management decisions. The 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.

<ul style="list-style-type: none"> • Utilize accepted standards, where available, for completion of assessments • Scale and accuracy of assessments will be appropriate for development and implementation of refuge habitat and wildlife management actions
Strategies Applied to Achieve Objective
a. Utilize scientific assessment results to implement management strategies to benefit ecosystems
b. Complete water resource assessment for the Refuge – Division of Engineering, Water Resources Branch
c. Develop a National Vegetation Classification Standard vegetation data layer for use in GIS
d. Conduct hydrological assessment at Bandon Marsh
e. Conduct baseline assessment of water chemistry and monitor changes over time to determine acidification rate
<p>Rationale: In accordance 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, hydrology) that are necessary to ensure that implementation of on-the-ground resource management actions identified resource management objectives identified under Goals 1 through 4. For example, a baseline estuary water chemistry analysis is lacking and needed to monitor the long-term potential effects of ocean acidification, a high risk to refuge resources.</p>

2.4.6 Goal 6: Provide and manage quality opportunities for visitors of all abilities to spend time outdoors observing and/or photographing freshwater wetland and estuary-dependent wildlife thus fostering an appreciation of and understanding for coastal wildlife and habitat.

<p>Objective 6.1 Provide high quality wildlife observation and wildlife/nature photography opportunities at the Bandon Marsh Unit</p> <p>Throughout the life of the CCP, provide visitors of all ages and different abilities with a variety of safe and accessible opportunities at the Bandon Marsh Unit to successfully observe or photograph wildlife while limiting the impacts of wildlife and habitat disturbance. Quality wildlife observation and wildlife/nature photography programs are defined by several elements including:</p> <ul style="list-style-type: none"> • Focus on major wildlife species and groups of wildlife species, including wintering waterfowl, migrating shorebirds, and other estuary-dependent wildlife • Uses appropriate facilities in order to view/photograph wildlife and their habitats • Emphasizing activities on a year-round basis • Satisfying a range of skill sets, from casual and beginning observers/photographers to more advanced observers/photographers
Strategies Applied to Achieve Objective
a. Develop a bird checklist
b. Maintain observation deck and parking lot
c. Allow unrestricted walking to observe and photograph wildlife
d. Work with Friends and partners to provide guided walks
e. Participate in and help coordinate the Annual Oregon Shorebird Festival

Rationale: Observation and photography of wildlife and nature promote public understanding and appreciation for the Refuge’s natural resources. The Service will continue to allow wildlife observation and photography to occur on the Bandon Marsh Unit. At the Bandon Marsh Unit infrastructure is already in place for wildlife observation and photography. The Refuge maintains a paved parking lot that can accommodate 10 passenger vehicles or two RVs/buses. The parking lot is located on the west side of Riverside Drive. An elevated boardwalk and deck extend from the parking lot west to the edge of the marsh. There are two interpretive panels on the viewing deck. Across the Coquille River to the north, a boat launch is located at Bullards Beach State Park. This launch can be used by visitors to launch both motorized and non-motorized boats to access the refuge unit during high tides.

All refuge lands on this unit are open to observation and photography year-round; thus visitors can walk or boat, unrestricted, throughout the unit to access the best views of wildlife. Wildlife observation and photography on this unit peaks during the bi-annual migration of shorebirds from mid-April through early May and again from early August through September. During this time the unit receives approximately 10-20 visitors daily, with most visitors remaining on the viewing deck. The highest daily public use of the Bandon Marsh Unit occurs annually during the Oregon Shorebird Festival, usually held in late August, which attracts between 70 and 130 birders.

Objective 6.2 Provide high quality wildlife observation and wildlife/nature photography opportunities at the Ni-les’tun Unit

Throughout the life of the CCP, visitors of all ages and different abilities can safely access the Ni-les’tun Unit of the Refuge and are successful at observing and photographing wildlife in a variety of habitats including tidal and freshwater marsh, and Sitka spruce-western hemlock forest. Quality wildlife observation and wildlife/nature photography programs are defined by several elements including:

- Focus on major wildlife species and groups of wildlife species, including wintering waterfowl, migrating shorebirds, and other estuary-dependent wildlife
- Uses appropriate facilities in order to view/photograph wildlife and their habitats
- Emphasizing activities on a year-round basis
- Satisfying a range of skill sets, from casual and beginning observers/photographers to more advanced observers/photographers

Strategies Applied to Achieve Objective

- a. Maintain the Ni-les’tun Marsh Overlook deck and elevated gravel trail that leads visitors from the parking lot to an observation point in the marsh
- b. Construct a loop trail that connects the Ni-les’tun parking lot with Fahys Creek and the uplands behind the refuge office. Open year-round
- c. Work with volunteers and partners to maintain trails
- d. Allow unrestricted walking on the Ni-les’tun Unit daily during from February through September
- e. Work with Friends and partners provide guided walks

Rationale: Observation and photography of wildlife and nature promote public understanding and appreciation for the Refuge’s natural resources. At the Ni-les’tun Unit the Refuge has infrastructure in place for visitors to engage in wildlife observation and photography. Current facilities include a public parking lot, a short graveled trail that leads out into the marsh and a viewing deck with a series of five interpretive panels.

However, the Service will add additional public use facilities to increase and/or enhance these uses. The Service will construct a loop trail and boardwalk that connects the Ni-les'tun parking lot with Fahys Creek and the uplands north of the refuge office. The loop trail will be open to observation, photography, and interpretation year-round during daylight hours. These recreational activities will be largely self-guided; visitors will be required to remain on the designated trail. At times, users engaged in these activities will be accompanied by refuge staff and/or trained volunteers (i.e., tours conducted during special events, school groups).

The Service will also open the Ni-les'tun Unit south of North Bank Lane to unrestricted walking to allow visitors to engage in wildlife observation and photography. The entire unit, with the exception of the Smith Tract residential and administrative area, will be open to these uses during daylight hours from February 1 through September 30. To avoid conflicts between visitors participating in waterfowl hunting and those engaged in wildlife observation or photography, the Ni-les'tun Unit will be closed to unrestricted walking from October 1 through January 31 annually, which coincides with the waterfowl hunting season. However, the viewing deck and marsh trail will remain open to these uses daily throughout the year. Due to the difficulty of walking throughout the marsh because of the presence of multiple tidal channels and downed large woody debris, the Service anticipates very little participation in wildlife observation and photography within the Ni-les'tun tidal marsh area.

The closure of the unit to all uses on non-hunting days during the waterfowl hunt season will allow the Refuge to monitor and determine the areas of most value to waterfowl within this still-evolving restored marsh. After five years of monitoring, we will reevaluate the intermittent program and if warranted, we will consider additional wildlife observation access.

2.4.7 Goal 7: In cooperation with our friends and partners, offer scientifically based environmental education and place-based interpretation for all ages that advances a connection with and an appreciation of fish and wildlife that use tidal and freshwater marshes.

Objective 7.1 Provide high quality environmental education opportunities for children and adults.

Throughout the life of the CCP, provide quality hands-on environmental education programs to community groups and schools with an emphasis on the themes of wetland restoration, shorebird and waterfowl ecology, Native American culture, climate change and the salmon life cycle. In addition, a high quality environmental education program at Bandon Marsh NWR will also include the following attributes:

- Enjoyable, hands-on, outdoor learning
- Appeal to a broad range of learning styles and provide interdisciplinary opportunities that link natural resources through multiple academic subject areas
- Be conducted to minimize impacts to fish, wildlife, plants, and their habitats; other compatible public uses; and refuge management programs and facilities
- Be directly linked to wildlife observation and interpretation programs

Strategies Applied to Achieve Objective

- a. Offering the Shorebird Sister Schools Program to 4th & 5th graders in Coos County
- b. Use interns to serve as environmental educators

c. Collaborate with partners to enhance EE opportunities, develop curriculum, and to ensure refuge programming is unique and does not conflict with other programming in the county
d. Work with SEA and Free Flight Wildlife Rehabilitation Center to develop and implement a bird of prey curriculum for all ages
e. Develop and offer citizen science projects for high school students in Coos County
f. Work with SEA to develop an environmental education center on the Anaflor Smith Tract
g. Hire a full-time permanent Environmental Education Specialist
h. Recruit, train and utilize volunteers to assist with delivery of on-site environmental education programs
<p>Rationale: Environmental education plays a key role in encouraging current and future generations to engage in environmentally responsible behavior like supporting the protection of habitat for wildlife through the National Wildlife Refuge System. Currently the Refuge offers one formal environmental education program, the Shorebird Sister Schools Program, but there is demand for additional programming covering different themes and topics. By partnering with SEA (see rationale for Objective 7.2 for a description of SEA’s history and role), Free Flight Wildlife Rehabilitation Center and others to develop and implement refuge-based curriculum for all ages the Refuge will be able to reach more students and community groups with a goal of developing an aware and environmentally literate citizenry.</p> <p>The current environmental education program promotes an understanding of the importance of shorebirds, the need for quality wetland habitat, and the role the USFWS plays in managing and protecting their habitat. The program, called the Shorebird Sister Schools Program, targets students in grades 4-6. Annually, the program’s teachers, interns, and volunteers reach approximately 700 students from schools in three coastal counties. The field component of the five-week program brings students to Bandon Marsh NWR or other estuaries, where the students (~ 75) spend two hours rotating through three field experience stations. The Refuge will continue the Shorebird Sister Schools Program, including bringing students to the Bandon Marsh Unit to view shorebirds.</p> <p>The Refuge will also develop citizen science projects for high school students in Coos County and when possible work with students in other grades to promote hands-on learning and an understanding and appreciation for the Refuge’s natural resources. The Service will require advance reservations for all groups participating in environmental education, and all groups will be instructed on refuge etiquette and ways to reduce wildlife and habitat disturbance.</p>

<p>Objective 7.2 Provide high quality interpretive opportunities</p> <p>Throughout the life of the CCP, provide visitors with opportunities for self-guided and refuge-led interpretation at Bandon Marsh NWR. A high quality interpretive program will consist of the following features:</p> <ul style="list-style-type: none"> • Emphasizes learning about shorebirds, salmonids, cultural resources, and habitat restoration • Emphasizes non-guided activities but also periodic guided programs
<p>Strategies Applied to Achieve Objective</p>
a. Maintain interpretive panels at the Bandon Marsh Unit
b. Maintain interpretive panels at the Ni-les’tun Unit
c. Develop additional interpretive panels for the marsh/forest boardwalk trail

d. Determine feasibility of offering seasonally guided paddle trips along the Coquille River adjacent to Bandon Marsh NWR

e. Partner with OPRD to offer campground programs that focus on refuge resources

f. Recruit and train volunteers to assist with delivery of campground programs

g. Hire a permanent, full-time Volunteer Coordinator & Interpreter

h. Work with SEA to expand their role in interpretation at Bandon Marsh NWR

Rationale: Interpretation is identified as one of the priority public uses of the National Wildlife Refuge System. Interpretation will be used at Bandon Marsh NWR as a way to provide information, either through a self-guided experience or one that is led by refuge staff, to visitors about shorebirds, salmon, cultural resources, and habitat restoration with an ultimate goal of enhancing their appreciation, understanding, and enjoyment of the Refuge’s natural resources. Interpretation will also be used to help in visitor management by sharing refuge rules and regulations in a manner that encourages visitors to care for the Refuge and its wildlife.

A successful interpretive program depends on the help of volunteers and partnerships. They are key components of the successful management of refuge lands and are vital to refuge biological and public use programs and projects. This is especially true in times of static or declining budgets. Currently the Refuge makes extensive use of volunteers in public use programs and to a lesser degree in habitat management and biological inventory and monitoring. In the future, successful implementation of environmental education and interpretation programs will require the use of partnerships, including expanding work with the refuge friends group and recruiting more volunteers. Thus it is important that the Refuge have a volunteer coordinator on staff to manage these critical partnerships.

The Friends of Southern Oregon Coastal Refuges is an official National Wildlife Refuge friends group to both Bandon Marsh and Oregon Islands National Wildlife Refuges. The group officially goes by the name Shoreline Education for Awareness (SEA). SEA currently has over 100 members. SEA projects have included assisting with management of the volunteer program for the South Coast Refuge Office, providing financial and volunteer support to the Raptors in the Classroom program, providing support to the Shorebird Sister Schools Program, providing seasonal interpretation for Oregon Islands NWR, holding special events, giving presentations to community groups and state parks, co-sponsoring a regional Friends Conference, serving as treasurer for the Oregon Shorebird Festival, and applying for grants to expand the refuge volunteer and EE programs. In the future the Service will continue to support the efforts of SEA and work to expand their role in the interpretive program.

2.4.8 Goal 8: Provide and manage safe, enjoyable, and high quality hunting and fishing opportunities for people of all ages that furthers the tradition of wildlife conservation and stewardship.

Objective 8.1 Provide opportunities for quality waterfowl hunting on the Bandon Marsh Unit

Throughout the life of the CCP, provide an opportunity for waterfowl hunters to hunt geese, a variety ducks, and coots on 256 acres while minimizing impacts to other wildlife, and other recreational users. Provide a quality, safe waterfowl hunt program that:

- Places a priority on safety
- Includes clear and concise regulations and makes them readily available.

<ul style="list-style-type: none"> • Poses minimal conflict with wildlife and habitat objectives • Poses minimal conflict with other priority public use activities • Poses minimal conflict with neighboring lands
Strategies Applied to Achieve Objective
a. Allow hunting, via boat or walk-in, seven days per week in accordance with ODFW hunting regulations
b. Work with partners to participate in waterfowl hunting workshops
c. Conduct outreach that provides hunters with information on refuge-specific, state and national hunting regulations
d. Develop an informational tear sheet on the rules and regulations of waterfowl hunting at Bandon Marsh NWR
e. Hire one full-time permanent Law Enforcement Officer
f. Conduct law enforcement patrols on a regular basis to ensure compliance with state and federal waterfowl hunting regulations
<p>Rationale: Hunting is identified as a priority public use by the NWRS Improvement Act because it promotes appreciation for and conservation of natural resources. Public waterfowl hunting opportunities in the area surrounding Bandon Marsh NWR and in the Coquille River Valley are extremely limited, with the Bandon Marsh Unit representing the only public land open to hunting. Private lands offer waterfowl hunting opportunities in the area but only to those who are granted permission and/or those willing and able to purchase hunting rights or leases. There is a demand for public hunting in the Coquille River Valley and Estuary, especially in areas that have walk-in access and do not require the use of a boat.</p> <p>The Service will continue to allow the hunting of waterfowl, defined here as geese, ducks, and coots. Hunting will be permitted in accordance with State and Federal regulations and seasons. Waterfowl hunting will continue to be allowed seven days per week on the 256 acre Bandon Marsh Unit on refuge lands that fall outside of Bandon city limits. Access to refuge lands for hunting will be allowed from one hour before sunrise to one hour after sunset. The use of lead ammunition to hunt waterfowl has been banned in the United States since 1991. In addition, Oregon State gamebird regulations state that the possession and use of shot other than federally-approved nontoxic shot is always prohibited while hunting waterfowl.</p> <p>For the Bandon Marsh Unit hunters will access the area by using the paved public parking lot associated with this unit located on the west side of Riverside Drive. The public may also access the Bandon Marsh Unit by boat during higher tides from the Coquille River. There are two boat launches nearby that hunters occasionally use to launch their watercraft.</p>

Objective 8.2 Provide opportunities for quality waterfowl hunting on the Ni-les'tun Unit
Throughout the life of the CCP, increase opportunities for duck hunters to hunt geese, ducks, and coots on 299 acres. A quality, safe hunting program on the Ni-les'tun Unit is described by the same elements as in Objective 8.1.
Strategies Applied to Achieve Objective
a. Prepare waterfowl hunt plan and opening package for the Ni-les'tun Unit
b. Open a portion of the Ni-les'tun Unit to hunting three days per week in accordance with ODFW hunting regulations

c. Provide hunters with walk-in or boat access
d. Develop an informational tear sheet on the rules and regulations of waterfowl hunting at Bandon Marsh NWR
e. Conduct law enforcement patrols on a regular basis to ensure compliance with state and federal waterfowl hunting regulations
f. Develop a parking lot to accommodate 3-4 vehicles along North Bank Lane at the NE corner of the Coquille River RV Park
g. Develop and sign a boat parking area along the Coquille River bank
<p>Rationale: Hunting is identified as a priority public use by the NWRS Improvement Act because it promotes appreciation for and conservation of natural resources. During the public scoping process there were many requests to allow waterfowl hunting on this unit of the Refuge. There are limited waterfowl hunting opportunities on the Oregon Coast, and there was specific interest in having walk-in opportunities for hunters without boats.</p> <p>The Service will expand waterfowl hunting, with specific conditions, on Bandon Marsh NWR to include the Ni-les'tun Unit. Hunting will be permitted in accordance with State and Federal regulations and seasons. Hunters will be allowed to hunt geese, ducks, and coots within 299 acres of the 400-acre Ni-les'tun Unit tidal marsh (Figure 2-1) 3 days per week. The established days for hunting on the Ni-les'tun Unit will be Wednesday, Saturday, and Sunday. Access to refuge lands for hunting will be allowed from one hour before sunrise to one hour after sunset. The use of lead ammunition to hunt waterfowl has been banned in the United States since 1991. In addition, Oregon State gamebird regulations state that the possession and use of shot other than federally-approved nontoxic shot is always prohibited while hunting waterfowl.</p> <p>For the Ni-les'tun Unit, hunters can either use the two boat launches mentioned previously, the boat launch at Rocky Point or they can use the refuge parking lot located on North Bank Lane across from the refuge office until the parking lot further west is developed. Near the northeast corner of the Coquille River RV Park, the Refuge will construct a small graveled parking area to accommodate three to four vehicles and this will serve as the hunter walk in access site when completed. All boats will be required to abide by "no wake" within refuge waters. Boats parking on the riverbank of the Coquille River will be required to park within a designated location.</p>

<p>Objective 8.3 Provide opportunities for quality fishing and clamming</p> <p>Throughout the life of the CCP, provide opportunities for visitors to dig for clams and fish from refuge lands in accordance with state and refuge fishing regulations, while minimizing impacts to other resources. Provide a quality fishing program that:</p> <ul style="list-style-type: none"> • Includes clear and concise regulations that are readily available • Poses minimal conflict with wildlife and habitat objectives • Poses minimal conflict with other priority public use activities
<p>Strategies Applied to Achieve Objective</p>
a. Work with partners to offer programs to anglers that increase their understanding of the importance of estuarine habitat to juvenile salmonids
b. Allow fishing on the Bandon Marsh Unit in accordance with ODFW fishing regulations
c. Allow clamming on the Bandon Marsh Unit in accordance with ODFW shellfishing regulations and subject to ODA and ODFW shellfish safety closures

- d. Prepare fishing plan and opening package for tidal portions of Fahys, No Name, and Redd Creeks on the Ni-les'tun Unit
- e. Allow artificial fly and lure fishing for cutthroat trout only, in accordance with refuge and ODFW regulations regarding allowable methods, on the tidal portions of Fahys, No Name, and Redd Creeks on the Ni-les'tun Unit
- f. Attend angler and outdoor sport enthusiasts' venues to present information on the importance of estuarine habitat and restoration for juvenile salmonids
- g. Conduct law enforcement patrols on a regular basis to ensure compliance with state and federal fishing regulations
- h. Develop a parking lot to accommodate 3-4 vehicles along North Bank Lane at the northeast corner of the Coquille River RV Park (also see Objective 8.2)

Rationale: Fishing is identified as a priority public use, and it is a popular visitor activity that occurs at many locations along the Oregon coast. The Service will continue to allow recreational fishing and clamming on the Bandon Marsh Unit (Figure 2-1). The continuation of allowing fishing within the Bandon Marsh Unit along the southern bank of the Coquille River provides an opportunity for people who do not own or have access to a boat. In addition, the Service will open a portion of the Ni-les'tun Unit to coastal cutthroat trout fishing with artificial lures only. Opening this area to cutthroat trout fishing, by boat or on foot, provides a wildlife-dependent form of recreation to all age groups and additionally provides an opportunity for people who do not own or have access to a boat.

All recreational fishing and clamming will be permitted in accordance with State, Federal, and refuge-specific regulations and seasons to ensure that it does not interfere with the conservation of fish and wildlife and their habitats, or conflict with other public use activities.

On the Bandon Marsh Unit two types of recreational fishing occur: fishing and clamming. Fishing for riverine fishes (e.g., salmonids, surfperch, sturgeon) is allowed along the Coquille River on the Bandon Marsh Unit. Anglers will be permitted to use pole and line or rod and reel while fishing, and in accordance with ODFW regulations for fishing in bays and tidelands. Anglers will be allowed to use either bait or artificial lures.

As used here, the term clamming encompasses the harvest of clams as well as the harvest of shrimp and other marine invertebrates for bait. Softshell clams can be harvested by digging with a hand shovel or using a clam gun (i.e., aluminum or PVC piped suction device). The entire mudflat habitat within the Bandon Marsh Unit is open to clamming under ODFW sport fishing regulations. If the Service is notified by the Oregon Department of Agriculture (ODA) and ODFW of a shellfish safety closure or contaminant issue that threatens human health, the Refuge will take corrective action (e.g., closure of fishing/hunting).

The locations where fishing and clamming are allowed on the Unit are not on designated trails; reaching these areas requires users to walk across mudflats, over tidal creeks with large woody debris or driftwood, or along the narrow edge of the Coquille River. All of these estuary and riverine habitats are affected by tidal waters which limit access and availability of mudflat habitat for clamming. Anglers can access fishing areas of the Bandon Marsh Unit by using the paved public parking lot associated with this unit located on the west side of Riverside Drive. Anglers may also access the Unit by boat during higher tides from the Coquille River.

The Service will allow fishing for cutthroat trout in the tidal creeks south of North Bank Lane within the Ni-les'tun Unit (Figure 2-1). The waters within Redd, No Name, and Fahys Creeks will be open to cutthroat trout fishing. The season for cutthroat trout fishing will coincide with ODFW's season for trout fishing, which typically begins the last weekend in May. The season on the Refuge will end on September 30 to avoid conflicts with the waterfowl hunting season, which begins in early October and continues through January.

Fishing access to these tidally influenced creeks south of North Bank Lane is limited and challenging due to tidal conditions and the presence of large woody debris or driftwood within the tidal creeks. To access fishing opportunities in the Ni-les'tun Unit, anglers can either use the boat launches at Bullards Beach, Port of Bandon, or Rocky Point, or they can use the refuge parking lot located on North Bank Lane across from the refuge office. Boats parking on the riverbank of the Coquille River will be required to park within a designated location. In addition, a small graveled parking area will be developed on refuge lands adjacent to North Bank Lane near the western edge of the Ni-les'tun Unit and will accommodate three to four vehicles for walk in access to Fahys Creek.

2.4.9 Goal 9: Provide facilities and materials that welcome and orient children and adults to the natural wonders of the fish and wildlife that use tidal and freshwater marshes, Sitka spruce forest, and riparian habitats.

Objective 9.1 Provide facilities that welcome and orient visitors
Throughout the life of the CCP, provide an integrated set of welcome and orientation facilities for visitors to: <ul style="list-style-type: none"> • 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
Strategies Applied to Achieve Objective
a. Remove or remodel current office and replace with a small administrative office/visitor contact station with multi-purpose and environmental education rooms
b. Participate in a community based visitor center within the city of Bandon through the development and maintenance of refuge-themed interpretive panels, exhibits and brochures
c. Build a 15 space parking lot by administrative office/visitor contact station to accommodate staff and visitors
d. Maintain existing maintenance shop with office
e. Maintain the two existing RV pads for refuge volunteers
f. Maintain refuge bunkhouse for use by staff, interns, volunteers, partners and researchers
g. Continue to provide SEA with office and storage space
h. Maintain existing 14 space parking lot by the Ni-les'tun Overlook
i. Add two additional RV sites for volunteers on the Smith Tract where the current residence is located
j. Replace current residence on Smith Tract with a small bunkhouse/office for friends group and

locate it on higher ground
k. Utilize habitat-appropriate native plants for landscaping around buildings, kiosks and other public use facilities
<p>Rationale: As described in the Oregon State Parks Regional Interpretive Framework (OPRD 2005), the Oregon Coast is considered one of the world’s most stunning landscapes. It features dramatic rocky shoreline, historic lighthouses, endless beaches, quaint seaside towns, and scenic bridges. The U.S. Highway 101 National Scenic Byway follows the shoreline and is the main route used by visitors who come to the coast from Portland and other inland population centers including Corvallis, Eugene, Roseburg, Medford, and Grants Pass. Bandon Dunes Golf Resort also draws visitors who access the area by plane using the North Bend Airport.</p> <p>According to OPRD, bird watching, walking, and day hiking will be the most popular recreation activities over the next 10 years (OPRD 2008). Consequently, the USFWS is expecting visitation to the Bandon Marsh NWR to increase. Facilities to support additional and increased tourism are essential. Visitors to the Oregon Coast NWR Complex including Bandon Marsh NWR will likely stop for a couple of reasons: a short 20-minute stop made to look at a view and take a picture, or a longer, one- to three-hour, stop allowing visitors to leave the car and stretch their legs. Interpretive signs and spotting scopes may enhance observation, interpretation, and education during short stops. Visitors making longer stops may be more interested in learning about the site, taking in a short program, or taking a short walk. Short loop trails, kiosks, signs, and spotting scopes are well suited in these locations and will serve to welcome and orient visitors to the Refuge once they are constructed.</p> <p>The road from U.S. Highway 101 to the South Coast Office at the Ni-les’tun Unit of Bandon Marsh NWR slows visitors down and provides a good transition for those arriving at the Refuge. The current South Coast Refuge Office location is well suited to visitor facilities. The site is north of North Bank Road across from the from the Ni-les’tun tidal marsh restoration site. The restoration site has an existing visitor parking lot, overlook and trail and offers great opportunities for bird watching and environmental education. The marsh restoration was completed in 2011 and is the largest in Oregon. A second trail, connecting the parking lot to the office was also completed in 2011.</p> <p>The Service will remove or remodel the current office and replace it with a small administrative office/visitor contact station with multi-purpose and EE rooms. To accommodate the refuge friends group, SEA, the Service will replace the current residence on Smith Tract with a small bunkhouse/office and locate it on higher ground.</p>

Objective 9.2 Conduct public outreach
Throughout the life of the CCP, conduct outreach to the public in an effort to: <ul style="list-style-type: none"> • Describe the Refuge and its place as part of the National Wildlife Refuge System • Provide current information about refuge management, biology, volunteer opportunities, public use events, and rules and regulations
Strategies Applied to Achieve Objective
a. Maintain an up-to-date brochure on the Refuge Complex
b. Partner with media outlets in Oregon to market public use opportunities on the Refuge
c. Participate in social media outreach

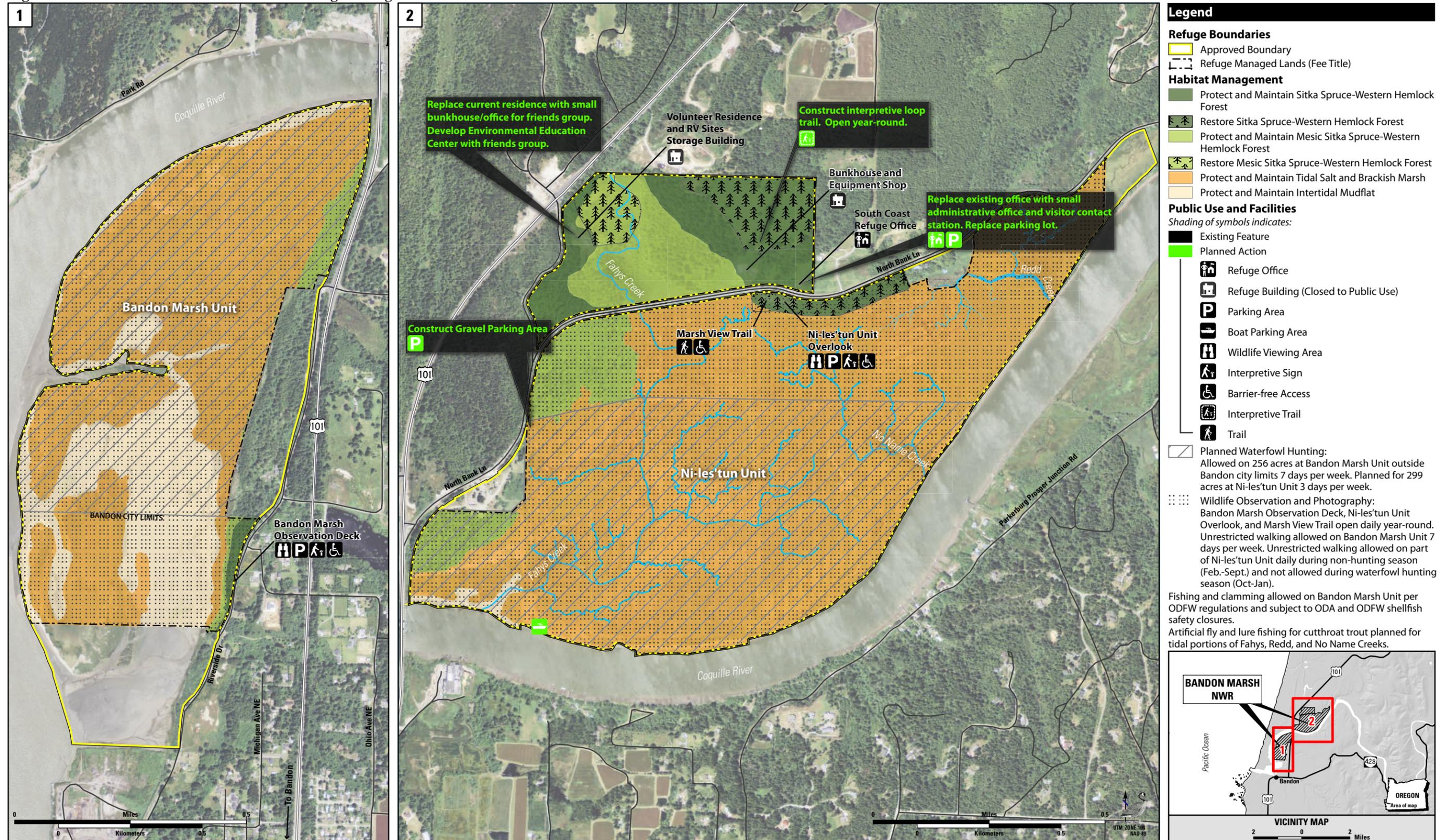
d. Maintain a refuge website
e. Maintain an online photo sharing database
f. Partner with non-profit conservation organizations and appropriate media outlets in Oregon to disseminate information about refuge wildlife and habitats
g. Maintain a refuge presence at community events that have high potential to deliver refuge messages to key audiences
h. Maintain a quarterly refuge newsletter
i. Evaluate the potential to develop digital trail guides for use on MP3 players and/or smartphones
Rationale: Outreach is critical in educating the public, volunteers, and partners about how refuges protect and conserve natural resources and what we are doing to provide economic benefits to communities. When people know and understand about the mission of the Service and the NWRS they are more likely to support the Refuge. Outreach can also improve visitors' awareness of regulations and policies and the reasons behind them.
Our outreach efforts will focus on providing specific information about Bandon Marsh NWR including important news and events, and outreach will be used as a means of building an online community of support for the Oregon coast refuges. Specific examples of outreach will involve maintaining a refuge website and utilizing social media to advertise volunteer opportunities, announce interpretative and environmental education events, relate news releases, distribute the refuge newsletter, share photos and videos, and provide an engaging view of what employees and volunteers do for the U.S. Fish and Wildlife Service's Oregon Coast NWR Complex.

Objective 9.3 Continue partnership with Refuge Friends Group
Throughout the life of the CCP, strengthen the partnership with the refuge friends group Shoreline Education for Awareness (SEA).
Strategies Applied to Achieve Objective
a. Continue to support SEA and provide technical support to them regarding refuge policies, regulations and needs
b. Every five years, review and if necessary revise the MOA between the Service and SEA
c. In conjunction with the friends group, develop habitat related projects that support refuge public use, monitoring, research and maintenance needs
d. Dedicate a refuge staff member to serve as the liaison between the friends group and the Refuge, including attendance at friends group board meetings
e. Work with friends group to recruit volunteers to conduct monitoring projects on the Refuge
f. Work with SEA to expand their role in communicating with visitors about refuge policies and wildlife resources
g. Work with friends group and volunteers to assist with maintenance of public use facilities and trails
Rationale: In the past 15 years a network of groups, called Friends, have adopted individual refuges or refuge complexes and have begun to advocate for the needs of the refuges by providing both financial and volunteer support. Support of friends groups and extensive use of volunteers are recognized as key components of the successful management of public lands and are vital to implementation of refuge wildlife and habitat programs. During these times of declining budgets, the National Wildlife Refuge System faces a growing shortage of staff, and in many cases funding for key conservation programs has been reduced.

Shoreline Education for Awareness, Inc. or SEA was founded in Bandon, Oregon in 1990, and it has been an all-volunteer organization supported by membership dues and donations received while interpreting the marine environment for visitors. In 2005, SEA entered into an MOA with the Complex to make SEA an official refuge Friends Group known as the Friends of the Southern Oregon Coast Refuges (Bandon Marsh and Oregon Islands NWRs). The MOA formalized the relationship between the Refuge Complex and SEA and facilitated open communication between both. It is important for the Complex to continue to support SEA as they play a critical role in providing volunteer interpretive support for the Refuge and are an advocate for protecting refuge wildlife and habitat.

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Figure 2-1. Bandon Marsh National Wildlife Refuge management direction.



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