



Chapter 2 Management Direction

USFWS

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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.

The Refuge’s Environmental Assessment on Management of Public Uses (USFWS 1997a) completed in 1997, evaluated the effects of public use activities on wildlife. At that time, the Refuge was divided into zones where public use activities were permitted or prohibited. The Refuge Improvement Act of 1997 defined the criteria used to determine if an activity is an appropriate use of a national wildlife refuge and created a new process for compatibility determination. With the development of this CCP, the Refuge’s public use activities were re-evaluated based on the refined criteria outlined under the Service’s appropriateness and compatibility policies (16 U.S.C. 668dd-668ee, 50 CFR 25, 26, and 29; and 603 FW 1 and 2).

Public involvement was an important part of the planning process. Local, State, and Federal agencies; Tribes; and elected officials were contacted by the planning team to ascertain priorities and issues as perceived by others. The team also contacted Refuge users, nonprofit groups, and community organizations to ensure that 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 public meetings in January and February 2012. Based on all of the information gathered and feedback from others throughout the public involvement process, the Service developed three draft alternatives for the Dungeness National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA) (USFWS 2012a), which was released in November 2012. Alternative B was selected as the preferred alternative.

The CCP planning team reviewed and evaluated all of the comments received during the Draft CCP/EA 90-day comment period. Alternative B was selected for implementation. In some cases, the management direction in Alternative B was clarified or modified based on public feedback. The details of public participation can be found in Appendix K, Public Involvement; the major changes between the draft and the final CCPs are identified in Appendix L, Comments Received and Service Responses, specifically, Table L-1.

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.

Active Shoreline Erosion Control and Bank Protection

Dungeness NWR's shoreline includes two sand spits, the 5.5 mile long Dungeness Spit, and the 1.4-mile long Graveyard Spit, and approximately 0.5 mile of bluff-backed beach. These shoreline features are dynamic and affected by the natural processes of sediment erosion, littoral transport, and deposition. Both the sand spits and bluff-backed beach are formed of sediment supplied by the erosion of coastal bluffs and moved by wave action and littoral drift.

In their natural state, beaches and their associated bluffs have a certain amount of built-in erosion protection. Gradual beach slopes dissipate wave energy and protect the toe of the bluff from direct wave action except at the highest tides. The movement of beach sediment also dissipates wave energy. The presence of drift logs, other large woody debris, and vegetation helps to retain sediments and absorb wave energy. Nevertheless, intermittent overwash events have occurred on Dungeness Spit during and after large storms. Additionally, due to significant wind and wave exposure, the bluffs at Dungeness NWR are experiencing erosion and recession.

Traditionally, erosion control and bank protection of the shoreline has been achieved through the use of engineered structures such as seawalls, bulkheads, revetments, and upland retaining walls. However, these structures disrupt natural geomorphic processes, reflect wave energy back onto the beach, and cutoff sources of sediment needed to maintain nearby beaches. Alternative measures such as beach nourishment, where sediment is artificially added to the beach, and bank stabilization actions (e.g., vegetation planting and/or large woody debris placement specifically to address erosion and slope stability) have also been used to restore or enhance beach functions. All of these shoreline erosion control and bank protection strategies were not included within the range of alternatives considered within this CCP due their lack of practicability and the Refuge's management emphasis upon allowing natural processes to take place. For example, while a spit breach may limit public access to parts of the spit during extreme high tides, these breaches are the result of natural disturbance processes and the spit would be naturally rebuilt over time in between storms.

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 emphasize protecting and maintaining forested, nearshore, freshwater wetland, and stream-riparian habitats, with an increased level of active habitat management, monitoring, and enhancement. A forest assessment will be conducted within the Dawley Unit and a step-down forest management plan will be completed by 2018. Active forest management techniques will be employed within a core 40-acre area to promote development of mature old-growth forest characteristics. A road inventory and condition assessment for the Dawley Unit will be completed by 2016. The amount of roads maintained will decrease, unneeded logging spur roads outside of the core area will be rehabilitated, and the slope along the main road will be stabilized. A wetland inventory and hydrological assessment will be conducted by 2015. The impoundment at the Dawley Unit will be managed for optimum water levels and benthic layer characteristics for amphibians and other benefiting species.

Public Use Management

Public use activities on the Refuge will include saltwater fishing, shell-fishing (clams and crabs), wildlife observation, wildlife photography, hiking, no-wake boating, jogging, horseback riding (should alternative access be obtained per compatibility determination), beach use (wading, other recreational beach uses), environmental education, and environmental interpretation. Areas that are open or closed to public use year-round, and areas that are open seasonally depending on the needs of Refuge wildlife, will remain the same with some exceptions. Changes will include new limits on boat landing hours on the beach directly south of the New Dungeness Light Station and jogging stipulations. Jogging will be allowed on the trail adjacent to the Refuge's parking lot and along the west beach from the end of the upland forested trail to the Refuge's western boundary. Horseback riding will be allowed with stipulations, on the beach west of where the main trail meets Dungeness Spit if a safe and legal alternate access route from the west or east can be obtained. If an alternate access route is obtained from the east, horseback use of a Refuge-owned road to the beach will also be allowed.

Additional wildlife viewing, interpretive, and environmental education programs will be offered. Staff and volunteer time devoted to making visitor contacts and community outreach will increase. New orientation materials, regulatory signage, and volunteer opportunities will be developed.

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 must be assessed, 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 Appendices A and 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.

The combined changes can affect the Refuge's habitats and species directly, such as the timing of migratory arrival of 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.

The Refuge 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 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. LCCs are formal science-management partnerships between the Service, Federal agencies, states, tribes, nongovernment 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.

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. As needed, objectives and strategies will be adjusted to assist in enhancing Refuge resources' resiliency 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; exploring the feasibility of photo-voltaic panels; and building appropriately sized, energy-efficient facilities, as funding becomes available. The Refuge will seek to 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.

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 and funding needs are included in Appendix C.

Maintenance and Upgrading of Existing Facilities

Periodic maintenance and upgrading of Refuge buildings and facilities will be necessary for safety and accessibility (e.g., compliance with the Architectural Barriers Act of 1968 and the Americans with Disabilities Act of 1990), reducing the Refuge's carbon footprint, and to support management and visitor needs, and is incorporated in the Service Asset Management System.

Management of Dawley Unit Structures and Property North of Highway 101

The Service plans to keep the Dawley Unit structures and property north of U.S. Highway 101 in caretaker status and work with other agencies or conservation organizations to pursue cooperative management.

Paleontological and Cultural Resources Protection

The possibility of finding paleontological resources on the Refuge is considered high. The collection and curation of paleontological resources will be managed under the Department of the Interior's Museum Property program and the Paleontological Resources Preservation Act (PRPA) of 2009. 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.

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 (see Objective 8.2). Neither the existence of this CCP nor any portion of its contents is intended to enlarge or diminish treaty rights or to have any influence over the resolution of unadjudicated treaty rights. The Service will coordinate with the appropriate Tribes as they exercise their treaty rights in an effort to minimize potential adverse impacts to Refuge resources.

County Coordination

The Service will continue to coordinate with Clallam County regarding the Dungeness trailhead parking lot and public restroom lease, invasive species management, conservation planning and marine issues (e.g., Marine Resource Committee).

State Coordination

The Service will continue to coordinate with Washington State agencies regarding areas of mutual interest. This includes communications with the Washington Department of Fish and Wildlife (WDFW) regarding management of state wildlife resources; Washington Department of Natural Resources (WDNR) regarding forest and aquatic lands management and biological surveys; Washington Department of Ecology (WDOE) on oil spill response (WDOE 2008); and Washington Department of Agriculture (WSDA) on *Spartina* detection and treatment.

Invasive Species Control

Because invasive plants and animals threaten the ecological integrity of the Refuge's wildlife and habitat, control of invasive species will be a high priority management activity. Invasive species such as *Spartina* and State and County-listed noxious weeds will continue to be a primary management concern. Additionally, nonnoxious weeds such as blackberry, English holly, and English ivy, and introduced animals such as feral cats, also limit the Refuge's ability to provide high quality habitat for establishment purposes and trust species, and will be controlled to the degree that funding permits. Invasive species control will be initiated prior to or concurrently with habitat restoration efforts.

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 nontarget 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.

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

Environmental harm may involve detrimental changes in ecological processes. For example, invasive plants in wetlands and uplands reduce migratory bird species food availability during all periods of the year. Environmental harm may also cause or be associated with economic losses and damage to human, plant, and animal health. For example, invasions by fire-promoting grasses that alter entire plant and animal communities eliminating or sharply reducing populations of many native plant and animal species can also greatly increase firefighting costs.

See Appendix G for 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, 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 on 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).

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 nonnative 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.

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. A Fire Management Plan (FMP) was completed for the entire Complex, including Protection Island and San Juan Islands Refuges, in 2004 (USFWS 2004a). A new FMP is in draft concurrently with this CCP.

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 1972, as amended (33 U.S.C. 1251-1382); appropriate evaluations and documentation under the National Environmental Policy Act; 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.

Participation in Planning and Review of Regional Development Activities

The Refuge staff will actively participate in and contribute to planning and conservation efforts for ongoing and future land and energy development projects, monitoring and research associated with climate change, oil spill response, removal of derelict fishing gear, and other activities that may affect Refuge wildlife resources and habitats. Pre-spill planning and preparedness is required by the Federal Oil and Pollution Act of 1990. Refuge staff has been involved with WDOE and others in preparing Area Geographic Response Plans, as part of the oil and hazardous substance spill prevention and response (Participation in Regional Planning and Conservation Efforts RCW Title 90 Chapter 90.56). Participation in the North Pacific LCC will provide Refuge staff with a means to tie in with a larger scale assessment of the impacts of climate change (USFWS 2010a). Protecting focal resources by supporting partners' efforts to reduce or eliminate fisheries bycatch and the removal of derelict fishing gear continues to be a priority for the Refuge. Refuge 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.

Refuge Revenue Sharing

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

Volunteer Opportunities and Partnerships

Volunteer opportunities are key components of the successful management of public lands, and are vital to Refuge programs, plans, and projects, especially in times of static or declining budgets. Currently the Refuge makes extensive use of volunteers in public use programs. In addition, interested volunteers participate in invasive species control, habitat restoration, and survey and monitoring activities. In the future, successful implementation of native habitat restoration and environmental education and interpretation programs will require the use of partnerships and volunteers.

Partnerships

Partnerships on the Refuge are critical components in maintaining and continuing efforts to enhance recreation opportunities or implement research directed towards adaptive management in response to climate change and other threats. These partnerships typically involve joining forces with federal, state, tribal, and local agencies and organizations.

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.

Land Protection

The Service has authority to acquire land or negotiate agreements on behalf of the National Wildlife Refuge System only within an approved refuge boundary. Lands within an approved refuge boundary may become part of the Refuge System through fee acquisition, conservation easement, or cooperative agreement. Service policy for land acquisition is to work on a willing seller/interested landowner basis. The Service will work with partners to assess conservation priorities within the surrounding areas in order to identify possible additions to the approved Refuge boundary.

The New Dungeness Light Station, within the approved Refuge boundary, is located on land withdrawn from the public domain for light station purposes and is under the administrative jurisdiction of the U.S. Coast Guard (USCG). In the event that the USCG declares the light station property excess to its needs, the Service will work with the USCG to bring the light station property into the Refuge System either through interagency cooperative management agreement or property jurisdiction transfer (i.e., Public Land Order by the Bureau of Land Management). Subsequently, the Service plans to enter into an agreement with the New Dungeness Light Station Association (NDLSA) to continue their management and maintenance of the light station facilities.

Bringing the USCG property into the Refuge System would contribute to achieving the Service's mission, the Refuge’s purposes, and would help meet several of our goals by allowing us to protect wildlife resources through control of activities associated with maintenance and operation of the light station facilities.

Table 2-1 Summary of Management Direction

Key Theme/Issue	Future Management
HABITAT MANAGEMENT	
<i>Mixed-coniferous Forest</i>	
Forest management within Dungeness Unit	<ul style="list-style-type: none"> - Invasive species removal. - Use fire suppression techniques to prevent catastrophic wildfire. - Clear downed or overhanging branches across the public use trails that are hazards. - Enhance the effectiveness of the main trail firebreak by removing dead and downed materials within 10 feet of either side of the trail; keep live and large woody debris >21 inches DBH and snags.
Forest management within Dawley Unit	<ul style="list-style-type: none"> - Continue invasive species removal and fire suppression. - Conduct forest assessment. - Develop step-down forest management plan by 2018. - Use various techniques such as, but not limited to snag creation, thinning, and prescribed fire to enhance forest structure within core 40-acre area. - Remove small dump site.

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Key Theme/Issue	Future Management
Roads within Dawley Unit	<ul style="list-style-type: none"> - Conduct road inventory and condition assessment by 2016. - Maintain main road for regular vehicles up to turnaround (0.95 mile), beyond that maintain for ATV only. - Slide stabilization, where needed. - Rehabilitate unneeded logging spur roads (0.58 mile) outside of 40-acre core area.
<i>Nearshore Habitats</i>	
<u>Multiple habitats</u> Oil spill and contaminants	<ul style="list-style-type: none"> - Rapid response in accordance with the Strait of Juan de Fuca Geographic Response Plan. - Collect and maintain information needed by the response team for resource protection. - Periodically review/ update Geographic Response Plan. - Increase staff participation in deployment drills. - Work with partners (WA Dept. of Ecology, oil spill response groups) on validating deployment locations and techniques within Refuge lands.
Sandy bluff habitat	<ul style="list-style-type: none"> - Maintain public use closure. - Use IPM to control invasive species. - Coordinate with partners (e.g., State, County, and Tribes) to prevent or reduce shoreline armoring, especially to the west of Dungeness NWR. - Restrict further development within 150 feet of the bluff on Refuge lands.
Barrier beach habitat	<ul style="list-style-type: none"> - Seasonal public use closures. - Regular removal of marine debris. - Prohibition of driftwood collection. - Fire suppression. - Rapid response in accordance with Strait of Juan de Fuca Geographic Response Plan. - IPM for invasive species control. - Work with partners to remove marine debris and creosote-covered logs in adjacent marine areas, off-Refuge, and increase removal in closed areas. - Monitor environmental factors that are climate change related stressors (e.g., accelerated erosion due to sea level rise and/or increased frequency and severity of storm events, driftwood recruitment and retention).
Mudflat and barrier lagoon	<ul style="list-style-type: none"> - Monitor and if found, remove invasive species (e.g., <i>Spartina</i>) using IPM techniques. - Monitor for European green crab. - Seasonal public use closures. - Coordinate with partners (e.g., Clean Water Working Group) to monitor and address water quality issues within Dungeness Bay and Harbor. - Rapid response in accordance with the Strait of Juan de Fuca Geographic Response Plan. - Removal of marine debris. - Monitor environmental factors that are climate change related stressors (e.g., sedimentation, ocean acidification, salinity). - Remove abandoned USCG road access dike located at base of spit if determined to be on Refuge lands.
Eelgrass Beds	<ul style="list-style-type: none"> - Coordinate with partners (e.g., Clean Water Working Group) to monitor and address water quality issues within Dungeness Bay and Harbor. - Coordinate with oil spill response team. - Monitor for European green crab. - Monitor environmental factors that are known stressors. - Work with partners to determine adaptive management techniques to address stressors (e.g., climate change, sedimentation, excessive nutrients).
Salt marsh	<ul style="list-style-type: none"> - Monitor and if found, remove invasive species (e.g., <i>Spartina</i>) using IPM techniques. - Public use closure. - Fire suppression. - Rapid response in accordance with the Strait of Juan de Fuca Geographic Response Plan. - Removal of marine debris and creosote-covered logs. - Monitor environmental factors that are known stressors (e.g., sedimentation, ocean acidification, salinity, vegetation community, driftwood recruitment and removal).

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Key Theme/Issue	Future Management
Freshwater Wetlands	
Seasonal freshwater wetlands on the Dawley and Dungeness units	<ul style="list-style-type: none"> - Conduct wetland inventory and hydrological assessment by 2015. - Conduct amphibian and bat surveys. - Use IPM to control invasive species.
Instream and riparian habitat	<ul style="list-style-type: none"> - Slope stabilization of main road. - Partner with upstream land owners to improve and protect water quality. - Conduct hydrological assessment by 2015. - Conduct survey and assess habitat suitability for anadromous and resident fish. - Use IPM to control invasive species.
Freshwater impoundment on Dawley Unit	<ul style="list-style-type: none"> - Maintain water delivery system to impoundment. - Maintain water level for use in fire suppression. - Clear woody vegetation from dike. - Conduct hydrological assessment of relationship between impoundment and domestic water source. - Map bathymetry of impoundment. - Conduct amphibian and bat surveys. - Install new water control structure and water gage. - Maintain minimum water levels and manage for optimum water levels/benthic layer characteristics for amphibians. - Manage vegetation and downed woody debris along waterline. - Use IPM to control invasive species (e.g., bullfrogs and nonnative fish).
Monitoring and Research	
Status monitoring (Surveys)	<ul style="list-style-type: none"> - Continue or expand bird counts (Christmas Bird Count, Mid-winter Waterfowl Survey) and monitoring for invasive plants, European green crab, marine debris. - Conduct breeding bird surveys. - Determine frequency of effort and monitor the distribution and densities of common eelgrass on the Refuge.
Research	<ul style="list-style-type: none"> - Caspian tern colony productivity. - Sediment dynamics at the base of Dungeness Spit. - Large woody debris monitoring in the Elwha nearshore. - Assess the value of salt marsh habitat on Graveyard Spit as a nursery area for crab, salmon, etc. - Assess driftwood recruitment and removal rates within the barrier beach and salt marsh habitats. - Plot and monitor microhabitat characteristics (e.g., species, percent cover) to track changes in distribution and diversity of plant species in the Graveyard Spit RNA. - Assess climate change impacts on natural spit habitats such as Dungeness Spit.
Effectiveness Monitoring	<ul style="list-style-type: none"> - Monitor CCP and other step-down plan objectives.
Scientific Assessments	<ul style="list-style-type: none"> - Conduct amphibian and bat surveys. - Follow-up assessment of the distribution and abundance of Lepidopterans on Graveyard and Dungeness spits. - Assess the number of breeding pairs of gulls in the colony at the tip of Graveyard Spit. - Conduct survey and assess habitat suitability for anadromous and resident fish. - Conduct wetlands inventory (Dawley Unit) and hydrological assessment (Dawley and Dungeness units) by 2015. - Conduct road inventory and condition assessment (Dawley Unit) by 2016.
PUBLIC USE	
Human-caused Wildlife Disturbance	
Aircraft disturbance	<ul style="list-style-type: none"> - Federal Aviation Administration 2,000 foot Above Ground Level flight recommendation over national wildlife refuges.
Refuge Foot Access – Open and Closed Areas	
Open areas: upland trails, strait-side of Dungeness Spit from west Refuge boundary to lighthouse (Zones 1, 2, and 3).	<ul style="list-style-type: none"> - Foot access only, sunrise to sunset.

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Key Theme/Issue	Future Management
Seasonal open areas: uplands and tidelands in the first ½ mile of the Spit's harbor side (Zone 2).	- Foot access only May 15-September 30, sunrise to sunset.
Temporary Closures	- Close portions of high use areas when seal pups present.
Closed areas: upland forest (except on established trails), bluffs, Graveyard Spit (Zone 4), end of Dungeness Spit (Zone 4), bay- and harbor- side of Dungeness Spit (Zone 4), Dawley Unit	- Closed to public use.
Refuge Motorized and Nonmotorized Boat Access – Open and Closed Areas	
Boat access – landings	- Allowed by advance reservation at designated lighthouse boat landing zone only. - Limited to 20 boat landings per day. - Boat landing limited to 9am-5pm.
Boat access – Refuge waters (tideland areas east and west of Graveyard Spit in Zone 5)	- Open to boating May 15-September 30, sunrise to sunset. - No wake zone in all Refuge waters. - Boats must stay 100 yards from the mean high tide line. - Refuge waters closed to personal watercraft, windsurfing, and para-surfing/sailing.
Boat buffers, non-Refuge waters	- Boaters are encouraged to stay at least 100 yards from the mean high tide line.
Visitor Orientation	
Staff and volunteer time devoted to making visitor contacts on the Refuge	- Increase staff time to 520 hours per year and volunteer time to 1,200 hours per year.
Orientation materials	- Tear sheet maps available at main trail entrance. Panel maps located at entrance station, base of main trail, and lighthouse boat landing area. - Add information and map panels at Cline Spit boat launch and Dungeness Landing boat launch. - Develop trail etiquette materials including brochure and signage.
Regulation Signs	- Signs at closed areas (permanent): bluffs; bay and harbor-side of spit at ½ mile to lighthouse; across end of spit at lighthouse; north side of trail adjacent to parking lot. - Signs at closed areas (seasonal): harbor-side of spit to ½ mile; boundary pilings in bay. - International symbol signage at: main and primitive trail entrance stations; bluffs. - Additional signs at lighthouse, lighthouse boat landing, and end of Dungeness Spit.
Wildlife-dependent Uses	
Wildlife Observation and Photography	- Unstructured opportunities to observe and photograph wildlife along approximately 1 mile of trails (including main, primitive, and bluff trails) and on approximately 5.5 miles of beach (Zones 1, 2, and 3). - Offer at least 5 guided wildlife walks and/or programs.
Fishing	- Permitted on Strait-side of spit and seasonally in boat access areas (Zones 1, 2, 3, and 5). - Install map and regulations panel at Cline Spit and Dungeness Landing. - Partner with WDFW to include Refuge-specific information in State sport fishing rules pamphlet.
Shell-fishing	- Permitted seasonally on Refuge tidelands in Dungeness Harbor and Bay up to 100 yards from the mean high tide line in Zone 5 and in all foot access tideland areas (first ½ mile of Spit, Zone 2). - Install map and regulations panel at Cline Spit and Dungeness Landing. - Partner with WDFW to include Refuge-specific information in State sport fishing rules pamphlet.
Interpretation – biological	- Maintain kiosk panel, trail panel, and overlook panels (6 panels) and Refuge brochures. - Use volunteers and subject-matter experts for interpretation programs. - Present 1 interpretive program per year. - Provide at least 2 guided plant walks and/or programs annually.

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Key Theme/Issue	Future Management
	<ul style="list-style-type: none"> - Improve wildlife interpretive displays at lighthouse. - Incorporate Refuge-specific climate change information into at least 1 interpretive product.
Interpretation – geological	<ul style="list-style-type: none"> - Kiosk panel, trail panel, overlook panel (1 panel). - Use trained and expert volunteers to provide interpretive information. - Present 1 interpretive program per year. - Provide 1 guided geology walk and/or program annually.
Environmental Education	<ul style="list-style-type: none"> - Continue to allow the Refuge to be used by others as an outdoor classroom. - Hire education specialist and offer education programs to primary and secondary level school groups on and off the Refuge. - Increase partnerships.
Other General Public Uses	
Beach use	<ul style="list-style-type: none"> - Recreational beach use allowed from west Refuge boundary to the first ½ mile of the spit (Zone 1 and Strait-side of Zone 2).
Horseback riding	<ul style="list-style-type: none"> - Allowed on west beach (Zone 1) with stipulations if an alternate access route is developed. - Daily, October 1-March 31, and weekdays, April 1-September 30. - No horseback riding on Memorial Day, the Fourth of July, and Labor Day. - Horses must walk (no trotting, cantering, or galloping). - Party size is limited to no more than 4 horses. - Pedestrians have right-of-way.
Jogging	<ul style="list-style-type: none"> - Allowed on west beach (Zone 1) and trail adjacent to the parking lot only. Not allowed on Dungeness Spit (Zones 2 and 3) and upland trails. - Monitor for repeated patterns of violations. If found, then will reevaluate compatibility.
Cultural Resources Interpretation and Education	
Interpretation – New Dungeness Light Station and maritime history	<ul style="list-style-type: none"> - Continue to partner with USCG and NDLSA to provide interpretation. - Continue to allow motorized access for keeper exchanges and facility maintenance. - Maintain human history interpretive panel in Refuge entrance kiosk. - In the event that the USCG declares the light station property excess to its needs, the Service will work with the USCG to bring the light station property into the Refuge System and enter into formal agreement with NDLSA on management.
Interpretation – Native American history and culture	<ul style="list-style-type: none"> - Maintain human history interpretive panel in Refuge entrance kiosk and displays in lighthouse. - Provide at least 1 interpretive product or program per year. - Partner with Tribe(s) to provide at least 1 Native American cultural program per year.
Cultural Resources Protection, Preservation and Evaluation	
Preservation - cultural resources	<ul style="list-style-type: none"> - Identify archaeological sites that coincide with existing and planned roads, facilities, public use areas, and habitat projects. - Conduct systematic documentation and evaluation of historic buildings. - Evaluate threatened and impacted sites and structures for eligibility to the National Register of Historic Places. - Develop a GIS layer for cultural resources that can be used with other GIS layers for the Refuge, yet contains appropriate locks to protect sensitive information. - Develop partnerships with the Tribes for cultural resources inventory, evaluation, and project monitoring, consistent with National Historic Preservation Act regulations. - Continue to coordinate with USCG to allow Aids to Navigation maintenance personnel motorized access for lighthouse servicing and repair.
Native American Graves Protection and Repatriation Act (NAGPRA)	<ul style="list-style-type: none"> - Identify Native American Tribes, Groups, and direct lineal descendants that may be affiliated with the Refuge lands. - Open consultation process with affiliated Tribes, Groups, and direct lineal descendants. - Develop procedures to follow for intentional and inadvertent discoveries. - Identify persons to contact for the purposes of NAGPRA compliance.
Community outreach	
Festivals and other public events	<ul style="list-style-type: none"> - Attend at least 3 events per year.
Community presentations	<ul style="list-style-type: none"> - Deliver at least 5 presentations per year about the Service and Washington Maritime NWRC.

Key Theme/Issue	Future Management
Refuge website	- Routinely upgrade and improved content. Add links to partners' and other resources.
Media outreach	- Increased coordination with media sources to improve the accuracy and content of Refuge-related articles. - Publish at least 2 local articles per year. - Target select media articles toward boating and aviation communities.
Volunteer Program	- Continue to work with Friends group. - Conduct 7 beach clean-ups per year. - Provide up to 4 full-time volunteer hosts. - Provide additional volunteer trainings.
Illegal Uses	
Pets, bicycles, resource collecting, fires, fireworks, discharging firearms, after hours trespass including camping, kite flying, ball playing, and Frisbees.	- Maintain and increase law enforcement patrols. - Maintain regulation information panels and signage. - Continue to use staff, volunteers, and trail rovers to inform visitors. - Replace regulatory and guidance signage at lighthouse boat landing zone and end of Dungeness Spit.

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 (USFWS 2004b).

The goals for Dungeness NWR over the next 15 years under the CCP are presented on the following pages. The goal order does not imply any priority. Priority actions are identified in the staffing and funding analysis (Appendix C, Implementation). Each goal is followed by its associated objectives. 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:

Habitats for all Refuge-managed lands depicted within the Service’s National Cadastral Geodatabase, current to August 1, 2012, were mapped based on the interpretation and analysis of 2011 true-color and color infrared orthorectified aerial photography. All Refuge habitat acreages calculated based on this mapping are approximate.

Below each objective statement are the strategies that could be employed in order to accomplish the objectives. The “Rationale” section provides additional information and the reasoning behind the objectives and strategies. Symbols used in the following tables include:

- % percent sign
- > Greater than
- < Less than
- ≥ Greater than or equal to
- ≤ Less than or equal to

2.4.1 Goal 1. Protect, maintain, and enhance the structure of forested habitats characteristic of mature to late-successional forest structures on the Olympic Peninsula for the benefit of forest-dependent species.

Objective 1.1. Protect and maintain mixed-coniferous forest in the Dungeness Unit
Annually, protect and maintain 57 acres of existing second growth conifer and hardwood forest within the Dungeness Unit for the benefit of primary cavity excavators (e.g., pileated woodpecker) and forest-dependent wildlife (e.g., amphibians). This habitat is characterized by the following: <ul style="list-style-type: none"> • Multi-aged, multi-layered, multi-species canopy consisting of Douglas-fir, western redcedar, western hemlock, bigleaf maple, and red alder. • Natural gaps in the canopy that promote regeneration of the dominant tree species. • Remnant (mature or old-growth) trees 100-200+ years old with average tree diameters >21 inches. • Absence of English holly and English ivy.
Strategies Applied to Achieve Objective
Management Strategies:
a. Use Integrated Pest Management (IPM) strategies including mechanical, physical, biological and chemical means to eradicate, control or contain invasive or undesirable species (see Appendix G).
b. Monitor for new infestations and, if found, remove all English holly and English ivy immediately.
c. Clear dead and downed branches that fall across the public use trails and within a buffer of 10 feet from both sides of main trail to maintain a fire break for ground fires; keep live and large woody debris >21 inches DBH and snags.
d. Use fire suppression techniques (including use of fire-lines, hand tools, backpack and slip-on water pumps) to prevent catastrophic wildfire on this unit.
Monitoring Strategies (see also Goal 4):
e. Conduct baseline forest inventory.
f. Continue monitoring of invasive species not currently found in early detection and rapid response (e.g., spurge laurel, herb Robert). See Appendix G.
g. Continue to conduct breeding bird survey and Christmas Bird Count.
h. Collect baseline data on the distribution and abundance of amphibians and bats.
Rationale: Numerous definitions of 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; diverse canopy conditions; number and minimum size of snags; and number and size of downed woody debris (DWD). This habitat type is in precipitous decline due to extensive logging and human settlement, resulting in approximately 3% of old-growth conifer stands in western Washington remaining. These stands are important for at least 1,000 species (WDFW 2005). Although the Dungeness Unit supports a small fragment of forested habitat, it serves as an example of a system that is decreasing elsewhere as young and mature stands continue to be intensively logged or converted to urban and residential uses.
The emphasis on this objective is to allow natural processes (e.g., windfall and natural regeneration in openings) to drive vegetative changes. Currently, the stand is considered a fragment of second growth forest that is isolated from other forested habitat on the Olympic Peninsula by residential and agricultural lands. However several patches within this stand contain late successional forest characteristics (e.g., clumps of older, remnant trees >21 inches DBH and a multi-layered, multi-

aged forest canopy) and provide important habitat for forest-dependent wildlife such as amphibians with limited range. Maintenance measures, primarily invasive plant control, will be regularly implemented. Pileated woodpecker has been selected as a focal species because it plays a key role in the creation of habitat for other forest wildlife (e.g., cavities for owls or forest carnivores), is indicative of mature to old growth habitat characteristics and can be found in urban environments supporting these habitat types. This species requires larger snags (5-18 snags >21 inches DBH and >25 feet tall/acre) or decadent trees (live trees with dead or broken tops) in early to moderate stages of decay for foraging, roosting and nesting (Mellen-McLean 2011). This is one functional component of the forested habitat on the Dungeness Unit that is present in minimal amounts. Downed woody debris is also in short supply on the forested landscape and an important life history component for amphibians. Limited information is available on specific habitat characteristics for amphibians; however Plethodontid salamanders (e.g., ensatina) prefer habitats with DWD in diameters of 3-11 inches (Aubry et al. 1988). Several bald eagle nests are located off-Refuge in adjacent forested habitat and they use larger trees on the Refuge as perches, particularly on the edge of the bay.

Several isolated patches of English holly and English ivy have been removed from this Unit. The invasive nature of these plants is the reason for the zero tolerance. Clallam County includes English ivy on their noxious weed list. Continued early detection and rapid response for these, and potential new invaders, is important in protecting the native flora from this unwanted competition.

The main trail acts as a minor fire break for ground fires. By expanding the clearing of vegetative material (e.g., small dead and downed debris), which is more likely to carry a fire, the forest will be better protected from a stand replacement fire.

Objective 1.2. Protect and enhance mixed-coniferous forest in the Dawley Unit

Initiate enhancement activities on up to 40 acres of the forested tract on the Dawley Unit to create mature to old-growth characteristics for the benefit of primary cavity excavators (e.g., pileated woodpecker), amphibians, bats, and other forest-dependent species by 2019. This forested habitat would be characterized by the following:

- Multi-aged, multi-layered, multi-species canopy consisting of Douglas-fir, western redcedar, western hemlock, and bigleaf maple.
- Natural gaps in the canopy that promote regeneration of the dominant tree species.
- 8 dominant (old-growth and mature) trees 100-200+ years old with tree diameters >32 inches DBH/acre.
- 12 sub dominant trees with >16 inches DBH/acre.
- >4 snags of >20 inches DBH and >15 feet tall/acre.
- 4 pieces of downed woody debris >24 inches diameter and >50 feet long/acre.
- Density range of 50-100 trees/acre.
- <10% of invasive species (e.g., spurge laurel, English ivy, English holly) in the forest structure.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Complete a step-down forest management plan by 2018.
- b. The Forest Management Plan will include the use of silviculture practices (e.g., thinning, prescribed fire, and inoculating) to advance mature to old-growth characteristics.
- c. Maintain main road for regular vehicles up to turnaround (mile point 0.95), beyond that maintain for ATV only.

d. Stabilize the slide at mile point 1.2 on the main road.
e. Rehabilitate 0.58 mile unneeded logging spur roads.
f. Use appropriate IPM techniques including mechanical, physical, biological, and chemical methods (see Appendix G) to control invasive or undesirable species.
g. Remove small dump sites.
h. Use fire suppression techniques (including but not limited to the use of fire-lines, hand tools, backpack and slip-on water pumps) to prevent catastrophic wildfire on this unit.
Monitoring Strategies (see also Goal 4):
i. Conduct forest assessment (e.g., % canopy closure, tree species, understory species, DBH of live trees, DBH and height of snags, snag density).
j. Conduct road inventory (e.g., skidder roads, culverts, etc.) and condition assessment by 2016.
k. Invasive species monitoring (e.g., spurge laurel, English ivy, English holly). See Appendix G.
l. Conduct periodic surveys to assess the success of forest management for use in adaptive management (e.g., breeding bird surveys, vegetative surveys, etc.).
m. Collect baseline data on the distribution and abundance of amphibians and bats.
<p>Rationale: The 123 acres of second growth within the Dawley Unit differs from that on the Dungeness Unit in that it is part of a continuous stretch of forested habitat that includes portions of the Olympic National Park, Olympic National Forest, and adjacent state and private forests. It also provides a wildlife corridor between nearshore and forested habitats. It currently supports trees up to 140 years old interspersed with dense pockets of smaller trees. Loss and fragmentation of mature to old-growth forests are the primary limiting factors to the distribution and/or breeding success of many forest-dependent species such as pileated woodpecker. With approximately 3% of original old-growth remaining in western Washington (WDFW 2005), active management toward mature to old-growth habitat is a high priority for the Refuge. This adaptation strategy is designed to increase forest resilience to climate change by reducing other stressors and increasing connectivity.</p> <p>This objective has been developed to accelerate the development of mature to old-growth characteristics within the stand using active management techniques. Specific management prescriptions will be identified under a separate step-down management plan. However, the majority of the characteristics listed above is the desired outcome over the next 75 years and have been adopted from the Old Growth Definition Task Group (1986) and WDFW (2008).</p> <p>In a preliminary assessment of the forested habitat of this unit, larger trees and snags (>24 inches DBH) and downed woody debris were identified as key components of mature to old-growth forest that were missing from the stand. Silviculture practices such as inoculation will accelerate creation of snags and downed woody debris in areas lacking these components. In addition, the core, northeastern segment of the unit currently supports a high density of small DBH trees (approximately 180 trees per acre) which is two to three times than that of historical densities (50-100 trees/acre). Thinning and prescribed fire will help return the stand to historical densities and provide gaps in the canopy for the accelerated growth of remaining trees. The use of prescribed fire will be outlined in greater detail in the FMP, but one typical use is the burning of brush piles created during thinning operations. Throughout the managed areas, climate change adaptation strategies such as planting native, drought tolerant or fire influenced species will be considered. The northwestern section of the stand appears to support suitable tree density as well as larger trees and snags however it is lacking in berry-producing plants which support a diversity of wildlife. This will be a key strategy toward enhancing this section. Along the southern section, the steep, unstable slopes within the forested, riparian corridor poses a problem for active forest</p>

management. For more information on management strategies in this section of the unit, see Objective 3.2.

A comprehensive forest assessment is needed to help formulate a suitable forest management plan as well as provide baseline data for use in effectiveness monitoring. The plan will be developed to primarily address the issues listed with various management techniques such as prescribed fire. A key component of forest management will be to minimize negative effects to forest-dependent wildlife during active management periods. This may include the use of a buffer zone around wetlands and seasonal restrictions on management activities. Breeding bird surveys and collection of baseline data for amphibians and bats will further inform development of the forest management plan. For more information on focal species selected for this habitat, see the rationale for Objective 1.1. Periodic surveys to assess management activities will be conducted and results will direct adaptive management.

Although the forest was logged, the presence of nonnative species is minimal. Some of the noxious and/or undesirable species that have been found are Scotch broom, English holly, English ivy, spurge laurel, and herb Robert. The Service uses a variety of control methods as different species require different techniques for control to be effective. The Service IPM policies outlines that the least environmentally harmful, yet effective method be use when controlling undesirable species.

Under the previous land owner a few small dumps sites had been established and used for personal property disposal. This included appliances, construction debris, and other miscellaneous items. In 2006, the Service conducted a Phase I and Phase II Environmental Site Assessment of the property. Hazardous asbestos containing material was found in two locations. These were removed by a contractor in 2009. Nonhazardous materials remain to be removed.

This unit does not have any natural fire breaks, and the few old logging roads would provide little opportunity to control a wildland fire. The main road had been maintained to allow access of small wildland fire engines. Many factors are considered to determine what control methods would be used during any given fire situation. The Service and its interagency wildland fire partners will determine what methods would be used on a case by case basis.

Current management of the roads involves minimal maintenance of 1.2 miles along the main road and several logging spur roads within the property. These roads were developed by the previous owner over a number of years. A slide has developed both above and below the main road at mile point 1.2. This slide has reached Dean Creek; however the degree of sedimentation due to the slide or the potential for further degradation is unknown. A road inventory and condition assessment is needed to determine the best practices for management of the road infrastructure. A geospatial database will be developed for all skidder roads, main roads, culverts, drainage crossing, and other access features. Following development of the forest management plan, all unnecessary logging spur roads will be rehabilitated.

2.4.2 Goal 2. Protect and maintain the diversity of nearshore habitats historically characteristic of the Salish Sea ecosystem for the benefit of native plants and marine associated wildlife.

<p>Objective 2.1. Protect and maintain the sandy bluff west of Dungeness Spit</p> <p>Annually, protect and maintain ½ mile of sandy bluff habitat west of Dungeness Spit to safeguard for the continuation of natural erosion processes that supply sediment to the spit. Natural bluff erosion will be protected by the following attributes:</p> <ul style="list-style-type: none"> • Limit impervious surfaces within 150 feet of the top of the bluff. • No public use of the bluff toe or face at any time. • No hard armoring (e.g., rip rap) on shoreline adjacent to the bluff.
<p>Strategies Applied to Achieve Objective</p>
<p>Management Strategies:</p>
<p>a. Enforce public use closure (see Objective 5.2).</p>
<p>b. Use IPM strategies including mechanical, physical, biological, and chemical means to eradicate, control, or contain invasive plants (see Appendix G).</p>
<p>c. Coordinate with partners (e.g., County, State, Tribes) to promote activities that reduce shoreline armoring, according to their conservation plans (EDPU 2005, WDEQ 1992), especially to the west of Dungeness NWR.</p>
<p>d. Replacement of existing or development of new facilities within 150 feet of bluffs will be guided by the Clallam County Shoreline Master Plan to the fullest extent possible.</p>
<p>Monitoring Strategies (see also Goal 4):</p>
<p>e. Invasive species monitoring. See Appendix G.</p>
<p>f. Work with partners to study environmental factors that are climate change related stressors (e.g., accelerated erosion due to sea level rise, increased frequency and severity of storm events, and/or erosion induced by excessive surface water runoff).</p>
<p>g. Continue existing research projects (e.g., sediment dynamics at the base of Dungeness Spit and large woody debris monitoring in conjunction with Elwha nearshore habitat studies) through to agreed-upon end dates.</p>
<p>Rationale: Sandy bluffs constitute approximately 60% of Puget Sound shores and are often referred to as “feeder bluffs” because natural erosion of these bluffs is the primary source of sediment for beaches in the area. However, one third of Puget Sound’s shoreline has been effectively eliminated from this natural cycle through armoring. Armoring is typically used to reduce erosion of bluffs adjacent to homes or important areas by placing sea walls or bulkheads parallel to bluff habitats (Johannessen and MacLennan 2007). Armoring has far-reaching negative effects on all nearshore habitats, primarily through the reduction of sediment deposition to sandy beaches. In addition, armoring can increase the wave energy reflected to down drift beaches and bluffs, thereby increasing the potential erosion rates (Johannessen and MacLennan 2007).</p> <p>Due to the dynamic nature of tidal habitats and the restricted scope of this management plan (Refuge lands only), there are relatively few viable actions available for management of this and subsequent nearshore habitats in this goal. The following actions have been identified to safeguard the natural erosion of sandy bluff habitat along the northwest corner of the Refuge: enforcing a year-round public use closure of the sandy bluffs and restricting development adjacent to the upper edge of the bluff on Refuge lands. The restriction on development adjacent to bluffs will decrease the amount of impervious surfaces upslope which in turn can reduce the amount of surface water runoff that would accelerate natural erosion. No further development of Refuge lands is planned at</p>

this time, however should the need arise within the time frame of this plan (e.g., Dungeness caretaker’s cabin), we will strive to follow guidelines set in place by the existing Clallam County Shoreline Master Plan as established for residential uses on Shorelines in the Natural Environment (WDEQ 1992). Currently, the County is developing the draft of a new Shoreline Master Plan. Once that plan has been approved by the County and the Washington Department of Ecology, the Service will adopt the guidelines in the final SMP. In addition, no hard armoring (e.g., rip rap) will be placed adjacent to bluffs on Refuge lands. Human intrusion and trespass within sandy bluff habitat have the potential to exacerbate erosion and cause disturbance to wildlife (e.g., burrow nesting pigeon guillemots). Threats from climate change include sea level rise as well as the increase in the incidence and severity of storm events further weakening the toe of the bluff and accelerating natural erosion. Bluff areas west of Dungeness Spit appear to be eroding at a rate of 0.5 to 3 feet per year on average but a single storm event or bluff failure can take as much as 28 feet of bluff at a time (ESA 2011). Given the importance of bluff habitat to the maintenance of barrier beaches and other nearshore habitats on Dungeness NWR, every effort will be made to safeguard the natural erosion processes. Strategies addressed in this goal are designed to reduce other stressors for wildlife and habitats of the nearshore environment thereby increasing resilience to climate change.

Objective 2.2. Protect and maintain the barrier beaches on Dungeness and Graveyard spits

Annually, for the benefit of native strand plants, marine mammals, and other migratory and resident wildlife, protect and maintain 239 acres of barrier beach along Dungeness and Graveyard spits with the following attributes:

- Natural deposition and/or erosion of sand and gravel.
- Continuous ridge of sand and gravel rising a short distance above high tide.
- Materials derived from erosion of nearby sandy bluffs.
- Presence of native strand plants including large-headed sedge and American dunegrass.
- Absence of marine debris.
- Presence of driftwood along the “backbone” of Dungeness Spit and the eastern side of Graveyard Spit.
- <1% total cover of Dalmatian toadflax and <20% total cover of cheat grass.
- No human disturbance during seasonal and year-round closures of the barrier beach habitats (see Objective 5.2).
- Absence of man-made or natural fires on the spits.
- Minimal to no impact from oil spills or other contaminants.
- Minimal creosote-covered logs or marine debris.

Strategies Applied to Achieve Objective

Management Strategies:

a. Maintain the seasonal public use closure to the interior portion of the first half-mile of the spit and year-round closure of the remainder of the interior portion; Graveyard and tip of Dungeness spits (see Objective 5.2).

b. Continue to prohibit driftwood collection.

c. Continue full fire suppression.

d. Continue routine removal of marine debris in open areas of the barrier beaches at least 5 times per year (see Objective 7.2).

e. Annually remove marine debris in closed areas of the Refuge.

f. Rapid response to oil spills or other contaminant events in Dungeness Bay and Dungeness Harbor in accordance with the Strait of Juan de Fuca Geographic Response Plan.

g. Remove 90% of known creosote-covered logs by 2020.
h. Work with partners to remove marine debris and creosote-covered logs in adjacent marine areas, off-Refuge.
i. Use IPM strategies including mechanical, physical, biological, and chemical means to eradicate, control, or contain invasive plants (see Appendix G).
Monitoring Strategies (see also Goal 4):
j. Invasive species monitoring (e.g., Dalmatian toadflax, cheatgrass). See Appendix G.
k. Monitor creosote-covered log deposition.
l. Work with partners to study environmental factors that are climate change related stressors (e.g., accelerated erosion due to sea level rise and/or increased frequency and severity of storm events, driftwood recruitment and retention).
m. Plot and monitor microhabitat characteristics (e.g., species, percent cover) to track changes in distribution and diversity of plant species in the Graveyard Spit RNA.
n. Conduct surveys to assess breeding bird distribution (e.g., gulls).
o. Assess the distribution and abundance of Lepidopterans (i.e., sand-verbena moth and Taylor’s checkerspot) on Graveyard and Dungeness spits.
p. Conduct breeding bird surveys and Christmas Bird Count.
q. Continue existing research projects (e.g., Caspian tern colony productivity) through to agreed-upon end dates.
<p>Rationale: Barrier beach habitat is defined as a relatively continuous ridge of sand and gravel rising a short distance above the high tide line and is often formed across embayments (Shipman 2008). On this Refuge, barrier beach habitat consists of Dungeness and Graveyard spits. Pacific harbor seals and native strand plants have been selected as focal species. Pacific harbor seals represent the lower shoreline component (traditionally referred to as the spit) while native strand plants represent key components of the upper portion of the barrier beach (traditionally referred to as strand). Dungeness Spit is considered one of the world’s longest natural sand spits. It totals approximately 5.5 miles and accretes (expands through deposition of sediment) toward the east at an average rate of 15 feet per year (USFWS 1997a).</p> <p>The strategies identified to manage and protect barrier beaches on Refuge lands include safeguarding the natural erosion of sandy bluff habitat, retention of driftwood through fire suppression and a prohibition of driftwood removal. The natural erosion of sandy bluffs is critical to the integrity of barrier beach habitat. Natural erosion supplies down drift beaches with fine sediments on a more gradual, protracted pace. Increased armoring and increases in the incidences and severity of storm events all lead to higher wave energy which accelerates erosion of down drift nearshore habitats. The driftwood found along the “backbone” of Dungeness Spit serves an important role in stabilizing the upper portion of the beach by holding sediments in place, particularly during high tide events that coincide with storms. Given the importance of driftwood to the barrier beach, full fire suppression and prohibition of the removal of driftwood is vital to the ecological integrity of this habitat type.</p> <p>Many of our partners have identified human disturbance as a pervasive and serious threat to wildlife and their habitats (WDFW 2005, Mills et al. 2005, Rojek et al. 2007, Tessler et al. 2007, USFWS 2005b). Refuge visitation ranged from 76,000-80,000 visitors per year for the last five years. The majority of use occurs primarily from May to September. This level of visitation in open areas or illegal trespass into closed areas cause stress and reduced productivity. Seals that are pupping in open areas are vulnerable to human-caused disturbance particularly because peak pupping periods coincide with periods of high visitation (Boren et al. 2003, Sanguinetti 2003).</p>

Disturbance can reduce fitness or increase mortality, especially during molt or nursing. Several studies have noted that pinnipeds have a disproportional, negative response to approaches by kayaks in contrast to other recreational vessels (Szaniszlo 2001, Grella et al. 2001) potentially due to the stealthy, low profile approach of a kayak. Human disturbance also affects nearshore habitats. Public use closures have been set in place to protect the integrity of habitat and reduce introduction of invasive species. For example, Graveyard Spit is closed to protect fragile strand plant communities from trampling, inadvertent introduction of invasive plant species, and illegal fires. The majority of invasive plant species in nearshore habitats of the Refuge can be found within the area surrounding the New Dungeness Light Station and an abandoned Navy facility on Graveyard Spit, areas of historically high public use.

Nearshore habitats of the Refuge are particularly at risk of contamination from oil spills and rogue creosote-covered logs, and wildlife is threatened by derelict gear and marine debris. The U.S. Coast Guard determined that Dungeness Spit is one of the top five high-risk areas in the U.S. for oil related spill events due, in part, to its prominent location within the Strait of Juan de Fuca and proximity to the high level of shipping traffic within the Salish Sea (Melvin et al. 2001). Predominantly westerly currents have transported oil and/or oiled birds from recent oil spills in Port Angeles Harbor (e.g., T/V Arco Anchorage in 1985). Creosote-covered logs, derelict gear, and marine debris are similarly transported. Creosote is of conservation concern because it contains chemicals (notably polycyclic aromatic hydrocarbons or PAHs) that are considered “highly” or “very highly” toxic to fish and aquatic invertebrates by the U.S. Environmental Protection Agency (USEPA 2008). Effects range from decreased productivity to low survival rates. WDNR removed 150 tons of creosote-covered logs from Dungeness Spit in 2006. During the same time frame, a study of creosote contamination on Dungeness Spit revealed that 2 of 9 creosote-covered logs contained PAH levels that exceeded Washington State Department of Ecology conservative standards (Holman and Lyons 2009). Studies have shown that PAHs tend to leach and remain in sediments with less oxygen such as those found in salt marshes, mudflats and the protected shore of barrier beaches (USEPA 2008, Holman and Lyons 2009). Therefore, removal is a priority for Refuge management. Derelict fishing gear (e.g., lost or abandoned nets) and marine debris (e.g., Styrofoam and plastic) pose a direct threat to marine birds and pinnipeds as it can entangle seals or be fed to seabird chicks causing mortality.

Climate change also poses a serious threat to this environment. According to modeling using the Sea-Level Affecting Marshes Model, within the time span of this plan, roughly half of the barrier beach habitat (not including the strand component of barrier beach) is predicted to be lost based on the 1 meter (3.3-foot) global average sea level rise scenario (through 2025; Clough and Larson 2010). In 100 years, 98% of this component of the barrier beach on Dungeness Spit is predicted to be lost to sea-level rise based on the 1 meter (3.3-foot) global average sea level rise scenario (Clough and Larson 2010). However, there is some uncertainty in these results due to a lack of precise geospatial data used in the models. For this reason, we propose studies to assess variables that affect sea level rise rate scenarios (e.g., sedimentation, geospatial extent of the spit and salt marshes, etc.). Given the dynamic nature of marine systems, reducing other stressors may be the only practical, large-scale adaptation approach available until the state of the science improves. For additional information on the threats posed by climate change to nearshore habitats, see Objective 2.1.

Graveyard Spit was designated a Research Natural Area (RNA) in 1990 because it supports high quality examples of low intertidal, high salinity, sandy marsh; high salinity coastal lagoon; and coastal spit with native vegetation. The RNA contains approximately 58 acres of native strand

habitat. This RNA provides an excellent opportunity to study the effects of climate change on a relatively undisturbed, stable strand plant community. In addition, one sand-verbena moth was collected here in 2008 via light trapping. This species is under consideration for listing under the Endangered Species Act. Targeted (Lepidopteron and Native Strand Plants) as well as general (breeding bird surveys and Christmas Bird Count) surveys will further inform management on changes to this environment as a result of climate change, disturbance, or invasive species stressors and inform adaptive management in the future.

Objective 2.3. Protect and maintain barrier lagoons and mudflats of Dungeness Harbor and Dungeness Bay

Annually, protect and maintain approximately 403 acres of barrier lagoon and mudflat habitats for the benefit of dunlin and associated species such as brant, forage fish, and marine invertebrates located in Dungeness Harbor and Dungeness Bay. This habitat is characterized by the following attributes:

- Absence of *Spartina* sp.
- Substrate primarily composed of fine silt.
- Shallow gradient benthic layer (i.e., <10 centimeters or <4 inches).
- Absence of human disturbance from Oct. 1-May 14 on Refuge portions of Dungeness Harbor and Bay; no human disturbance year-round to the lagoons within the spits (see Objective 5.2).
- No creosote-covered logs on or near mudflats and the barrier lagoon habitats.
- Absence of marine debris.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Maintain the seasonal public use closure within Dungeness Harbor and Bay portions of the Refuge and year-round closure in the lagoons within Dungeness and Graveyard spits (see Objective 5.2).
- b. Use appropriate IPM techniques including mechanical, physical, biological, and chemical methods (see Appendix G) to control invasive or undesirable species.
- c. Rapid response to oil spills or other contaminant events in Dungeness Bay and Dungeness Harbor in accordance with the Strait of Juan de Fuca Geographic Response Plan.
- d. Monitor and if found, remove invasive species (e.g., *Spartina*) immediately.
- e. Increase annual removal of marine debris efforts.
- f. Coordinate with partners (e.g., Clean Water Working Group) to address water quality issues within Dungeness Bay and Harbor.
- g. Determine if the abandoned USCG's former access road dike at the base of the spit is located on Refuge land, and if so remove it.

Monitoring Strategies (see also Goal 4):

- h. Invasive species monitoring (e.g., *Spartina* and European green crab). See Appendix G.
- i. Work with partners to study aspects of habitat quality of mudflats (e.g., macro- and micro-invertebrate abundance and distribution; water quality; and forage fish abundance and distribution).
- j. Continue to conduct Mid-winter Waterfowl Surveys and formalize overwintering and migratory shorebird surveys to assess the Refuge's contribution to overwintering and migratory refugia in the Salish Sea.
- k. Work with partners to monitor environmental factors that are climate change related stressors (e.g., changes to rate of sedimentation, temperatures, and salinity; ocean acidification).

Rationale: Barrier lagoons are tidal embayments that lack a significant freshwater source and are often associated with barrier beaches which protect them from wave action (Shipman 2008). Common elements include intertidal mudflats and high tidal flats. The intertidal mudflats of these lagoons are found between Mean Higher High Water (MHHW) and Mean Lower Low Water (MLLW). High tidal flats consist primarily of sandy shores with a thin ring of salt marsh vegetation bordering the uplands. Barrier lagoons support a high abundance of wildlife including marine birds; marine invertebrates and their larvae (e.g., littleneck clam, Dungeness crab, and polychaete worms); forage fish; and marine mammals. Dunlin has been selected as the focal species for this habitat type.

Approximately 403 acres of barrier lagoon and mudflat habitats are found within the Refuge in Dungeness Harbor, the interior of both spits, and east of Graveyard Spit in Dungeness Bay. Approximately 47 of those acres are barrier lagoon while 356 acres are intertidal mudflat. Both habitats are managed by the Service in the same way under a perpetual easement with WDNR as tidelands of the second class. Current management includes invasive species monitoring and removal as well as coordination with partners on oil spill preparedness and solving clean water issues. By their very nature, barrier lagoons are partially protected from oil spill contamination; however due to the limited tidal action within this habitat type, they are also more vulnerable to persistence of contaminants. For more information on threats from climate change, marine debris, or creosote contamination, see Objectives 2.1 and 2.2. For more information on the threat posed by human disturbance, see Objective 2.2.

Spartina anglica was initially found within the barrier lagoon on Dungeness Spit in 2007 and approximately 27 square feet was removed. It has been found and removed each year since that time. In 2011, approximately 6 square feet was removed. Mechanical means of control have been sufficient to keep up with this infestation.

The proposed removal of the abandoned USCG road would require a survey to determine if the dike road is on a portion of the Refuge. The Service will coordinate with the USCG and BLM in order to determine ownership. If it is found to be under Refuge ownership that portion will be removed. The Service has been participating in an early detection monitoring program for European green crab with WDFW. Recently, European green crab was detected on the Canadian side of the Salish Sea. They are considered very invasive and have a negative impact by competing with wildlife such as native crabs and are major predators on clams, mussels, juvenile fishes and other species (PSP 2009).

There are 41 acres of barrier lagoon habitat in the Graveyard Spit RNA. This RNA provides an excellent opportunity to study the effects of sea level rise.

Objective 2.4 Protect and maintain common eelgrass beds in Dungeness Harbor and Dungeness Bay

Annually, protect and maintain common eelgrass beds within Dungeness NWR tidelands for the benefit of brant and other overwintering waterfowl; forage fish; and marine invertebrates. The Refuge supports approximately 314 acres of eelgrass beds (Figure 2-1), estimated based on Wilson (1993) and Norris and Fraser (2009). Since this includes areas of sparse, patchy, and dense coverage, the actual footprint of eelgrass beds is smaller.

<p>Target habitat conditions exhibit the following characteristics:</p> <ul style="list-style-type: none"> • Intertidal areas with muddy to sandy substrates. • Depth range from +0.4 to -8.8 meters (+1.3 feet to -28.9 feet), average is -3.5 meters (11.5 feet) (relative to MLLW). • Low- to moderately high-energy environments (waves and currents). • Absence of marine debris. • Absence of human disturbance from Oct. 1-May 14 on the Refuge portion of Dungeness Harbor and Bay.
<p>Strategies Applied to Achieve Objective</p>
<p>Management Strategies:</p>
<p>a. Maintain the seasonal public use closure on the Refuge portion of Dungeness Harbor and Bay (see Objective 5.2).</p>
<p>b. Rapid response to oil spills or other contaminant events in Dungeness Bay and Dungeness Harbor in accordance with the Strait of Juan de Fuca Geographic Response Plan.</p>
<p>c. Work with partners on monitoring and removal of derelict gear (e.g., crab pots) in eelgrass habitats on and off-Refuge.</p>
<p>d. Coordinate with partners (e.g., Clean Water Working Group) to monitor and address water quality issues within Dungeness Bay and Harbor.</p>
<p>Monitoring Strategies (see also Goal 4):</p>
<p>e. Determine frequency of survey effort and monitor the distribution and density of common eelgrass on the Refuge.</p>
<p>f. Invasive species monitoring (e.g., European green crab). See Appendix G.</p>
<p>g. Work with partners to study environmental factors that are climate change related stressors (e.g., accelerated erosion due to sea level rise, increased frequency and severity of storm events, and/or erosion induced by excessive surface water runoff).</p>
<p>Rationale: Common eelgrass is a vital component of the nearshore environment providing shelter for forage fish spawning (e.g., Pacific herring, surf smelt, Pacific sand lance), and young anadromous fish. It also provides forage for brant, other waterfowl, and marine invertebrates (e.g., Dungeness crab, snails, and urchin). Finally it serves an important function as a carbon sink in the nearshore environment. Despite its importance to the ecoregion, minimal long-term data exist to determine the status of common eelgrass throughout the Salish Sea. However, studies conducted in 1987 and 1991 in Dungeness Harbor reveal a decline of approximately 40% (120 acres) between years (Wilson 1993). The reasons for this decline vary, however a portion of the loss was attributed to the dynamic nature of intertidal areas and former common eelgrass beds covered by <i>Ulva spp.</i> (Wilson 1993). In addition, the Dungeness Bay/Sequim Bay Pacific herring stock is listed as declining while the regional (Strait of Juan de Fuca) stocks are considered critical (Stick and Lindquist 2009). The exact cause of decline in these stocks is unknown, but loss or degradation of habitat, pollution, and changes in prey and predator distribution have been proposed (WDFW 2005). This species prefers to spawn on common eelgrass almost exclusively in this area. The plant itself has been selected as a focal species for the habitat.</p>
<p>Approximately 314 acres of common eelgrass beds are managed by the Service under a perpetual easement for the second class tidelands. This acreage figure is estimated based on Wilson (1993) and Norris and Fraser (2009) and represents the total extent of eelgrass beds within the Refuge. Since this includes areas of sparse, patchy, and dense coverage, the actual footprint of eelgrass beds is smaller. The majority of these beds are located within Dungeness Harbor due west of Graveyard Spit with the remainder located due east of Graveyard Spit in Dungeness Bay. Common eelgrass restoration within the Salish Sea has a highly variable success rate (13-80%) and is very</p>

costly (\$100,000-\$1,000,000; Mumford 2007). As a result, current and future management actions on the Refuge consist of protecting existing beds from invasive species, contamination, and poor water quality. In addition, the Refuge will maintain a public use closure of the tidelands and open water encompassed within Refuge boundaries from October 1 through May 14.

Primary limiting factors for common eelgrass growth include light availability and water temperature which drive photosynthesis. These growth factors are highly affected by water quality (e.g., excessive nutrients foster algal blooms; heavy sedimentation blocks light; oil contamination blocks light and kills plants). Increased sedimentation from boat wakes and damage from propellers or persistent marine debris also threaten common eelgrass growth and eelgrass bed continuity. Climate change has the potential to raise water levels, increase temperature stress, and/or increase periods of turbidity as a result of increases in wave heights and storm events which would limit growth of common eelgrass. Research has shown that sea surface temperatures within the Strait of Juan de Fuca have increased with the 1990s noted as the warmest decade on record since the 1840s; researchers expect the warming trend to continue (Snover et al. 2005). For more information on the effects of human disturbance, marine debris and contamination see Objective 2.2.

Objective 2.5 Protect and maintain salt marsh on Graveyard Spit

Annually, protect and maintain approximately 52 acres of salt marsh habitat within Graveyard Spit to benefit marine invertebrates, forage fish, and waterfowl. This habitat is characterized by the following attributes:

- Vegetation dominated primarily by American glasswort.
- Infrequent inundation except at highest high tides.
- Maximum of 40% coverage by driftwood.
- Absence of man-made or natural fires.
- Absence of creosote-covered logs.
- <1% invasive plant species (e.g., *Spartina*) cover.
- No human disturbance year-round (see Objective 5.2).

Strategies Applied to Achieve Objective

Management Strategies:

- a. Maintain year-round public use closure (see Objective 5.2).
- b. Monitor, and if found, remove invasive species (e.g., *Spartina*) immediately.
- c. Continue full fire suppression.
- d. Remove 90% of known creosote-covered logs by 2020.
- e. Annual marine debris removal in salt marsh habitats.
- f. Use IPM strategies including mechanical, physical, biological, and chemical means to eradicate, control, or contain invasive species (see Appendix G).
- g. Rapid response to oil spills or other contaminant events in Dungeness Bay and Dungeness Harbor in accordance with the Strait of Juan de Fuca Geographic Response Plan.

Monitoring Strategies (see also Goal 4):

- h. Study key ecological attributes (hydrological flows and tidal elevation/cycles) and their effects on sedimentation rates (accretion/erosion) as well as driftwood recruitment.
- i. Identify use and assess the value of these wetlands as nursery areas for marine invertebrates.
- j. Invasive species monitoring (e.g., *Spartina*). See Appendix G.
- k. Monitor creosote-covered log deposition.
- l. Assess the number of breeding pairs in the gull colony at the tip of Graveyard Spit.

m. Work with partners to study environmental factors that are climate change related stressors (e.g., ocean acidification, changes to the vegetative community due to increased inundation, etc.).

Rationale: Salt marshes are among the most productive ecosystems on earth because they contribute greatly to the base of the food chain. In the nearshore environment, this food chain starts with one-celled microscopic floating plants called phytoplanktonic algae. These algae are consumed by minute floating animals (zooplankton); anadromous and forage fishes; and marine invertebrate larvae to name a few. Phytoplankton production is especially high in the nearshore because of high nutrient concentrations resulting from decaying marsh vegetation. The resulting dissolved organic materials are flushed from the marsh by tides and wind into adjacent nearshore habitats (Gosselink 1980). Salt marshes are important components of the nearshore ecosystem for a host of other reasons. They serve as an import nursery for commercially important species such as marine invertebrates (e.g., Dungeness crab) which seek these areas for refugia. They filter pollutants (e.g., nitrogen) from the water and break them down into less harmful forms. In addition, they buffer inland areas from the damaging effects of severe storms and act as water reservoirs that may reduce flooding in surrounding uplands. Finally, salt marsh plants remove carbon from the atmosphere and store it as undecomposed materials in the soil. Yet despite their significance, approximately 70% of tidally influenced wetlands have been lost since the Puget Sound was first settled (PSP 2013).

Approximately 52 acres of salt marsh can be found on both the northern and southern ends of Graveyard Spit. In each salt marsh, one or two channels serve as the conduit for saltwater intrusion but the entire marsh is not typically flooded each day; inundation occurs on the highest of high tides. As with the barrier beach, these salt marshes contain a bulwark of driftwood along their northern borders which adds to the organic material available for decomposition and provides cover for marine invertebrates. The predominant plant covering these marshes is American glasswort.

The purpose of this objective is to protect the existing habitat within the scope of this plan. Management actions will remain the same and include maintaining a public use closure; assuring that the driftwood accumulation is preserved through full fire suppression; contaminants are reduced or eliminated through removal of creosote-covered logs; and rapid response to oil spills. Due to the limited extent of salt marsh habitats on the Refuge, minimal change is predicted as a result of sea level rise within the life time of this management plan (i.e., 2025 under the 1-meter 34.3-foot) rise scenario; Clough and Larson 2010). However, this model is in need of improvement, particularly increasing the accuracy of the habitat data layer used (e.g., the south marsh is not delineated) and incorporating effects from other stressors due to climate change. As a result, we plan studies to assess variables associated with climate change stressors (e.g., accretion, salinity, driftwood recruitment, etc.) and steps to improve geospatial data layers used in the model. For more information on the threat of sea level rise, creosote-covered logs and fire suppression see Objective 2.2. For more information on the threat of oil spills see Objective 2.4. The threat of human disturbance in salt marsh habitats on the Refuge is particularly relevant to the southern marsh which supports a small colony of breeding glaucous-winged gulls. For more information on human disturbance of marine birds and habitats, see Objective 2.2.

2.4.3 Goal 3. Enhance and/or protect freshwater wetlands for the benefit of wetland-dependent species.

Objective 3.1 Protect and maintain seasonal, freshwater wetlands on the Dawley and Dungeness units

Annually, protect and maintain small (<0.1 acre), seasonal freshwater wetlands located on the Dawley and Dungeness units for the benefit of amphibians, bats, and other wildlife species. These wetlands are characterized by the following attributes:

- Conditions vary from dry in late summer to as high as 3 feet in spring.
- Up to 80% short emergent vegetation (e.g., *Scirpus*, *Carex*, and *Juncus* spp.).
- Up to 10% cover of downed woody debris from the shoreline into the wetland.
- Absence of aquatic invasive plants and animals (e.g., American bullfrog, purple loosestrife, or Bohemian knotweed).

Strategies Applied to Achieve Objective

Management Strategies:

a. Use appropriate IPM techniques including mechanical, physical, biological, and chemical methods (see Appendix G) to control invasive or undesirable species.

b. Remove nonnative fish and American bullfrogs if present.

Monitoring Strategies (see also Goal 4):

c. Invasive species monitoring (e.g., American bullfrog, purple loosestrife, Bohemian knotweed). See Appendix G.

d. Conduct wetland inventory and hydrological assessment by 2015.

e. Collect baseline data on the distribution and abundance of amphibians and bats.

Rationale: These wetlands are classified by the USFWS as palustrine forested wetlands (wetlands <20 acres and <6.6 feet deep) which are considered a decreasing wetland type, particularly those of less than 5 acres (Cowardin et al. 1979, Dahl 2006, Johnson and O'Neil 2001). Approximately 31% of all wetlands have been lost in Washington State through the late 1970s (Dahl 1990). Within the Sequim Bay watershed, freshwater wetlands account for <1.5% of the land base (EDPU 2005). Small, ephemeral wetlands are important components of the landscape for amphibians as they provide refugia during dispersal or migration. As a result, amphibians have been identified as focal species for this habitat type. In addition, wetlands provide openings within the canopy for bats which feed on insects found in profusion around wetlands.

A small (<0.05 acre) seasonal freshwater wetland is located in the uplands of the Dungeness Unit. This linear wetland is dominated by slough sedge and water hemlock and is surrounded by a red alder forest. In the winter months, it is capable of supporting two pools with 8-10 inches of standing water. A similar 0.05 acre seasonal freshwater wetland is located on the Dawley Unit. This wetland is deeper and holds water longer into the summer. These two wetlands appear to be healthy as indicated by the presence of amphibians, native vegetation, and aquatic invertebrates. The amount of water and consequently, persistence into the summer season varies with the level of precipitation throughout the year. As a result, these wetlands are threatened by climate change induced alteration of temperature and precipitation cycles.

These strategies are designed primarily to acquire more information about the seasonal condition and use of these wetlands, which will further guide management actions. Because most amphibians require two or more different habitat types in close proximity during their life cycle, forest management will incorporate spatial and seasonal restrictions suggested by Pilliod and Wind

(2008). More active management for amphibians and their habitats is intended to aid them in adapting to climate change by providing refugia in the form of habitat free of other stressors. For more information, see Objective 1.2.

Objective 3.2 Protect and maintain riparian corridor and instream habitat on the Dawley Unit

For the benefit of anadromous and resident fish and instream amphibians, protect and maintain ¼ mile of instream habitat in Dean Creek on the Dawley Unit. Ideal instream habitat is characterized by the following attributes:

- Intact riparian corridor providing stream surface shade of 60-80%.
- Overstory riparian vegetation characterized by red alder, bigleaf maple, Douglas-fir, and western redcedar.
- Understory riparian vegetation characterized by Pacific rhododendron, salal, salmonberry, and sword fern.
- <10% cover of invasive plants.
- Low amounts of fine sediments.
- Cool temperatures (<73°F) with a preferred temperature range (40-58°F).
- Well-oxygenated water, with dissolved oxygen levels >5 parts per million.
- Instream presence of large woody debris.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Initiate measures to stabilize the slope along the upper reaches of the main road within the riparian corridor.
- b. Partner with upstream land managers to improve and protect water quality within the riparian corridor.
- c. Use appropriate IPM techniques including mechanical, physical, biological, and chemical methods (see Appendix G) partnering with others to control invasive or undesirable species.

Monitoring Strategies (see also Goal 4):

- d. Invasive species monitoring. See Appendix G.
- e. Assess instream habitat for anadromous and resident fish suitability by 2013.
- f. Conduct hydrological assessment of the Dawley Unit by 2015.
- g. Collect baseline data on the distribution and abundance of amphibians and instream fish.

Rationale: Dean Creek is an intermittent stream that drains 3 square miles of land within the Sequim Bay Watershed (EDPU 2005). Approximately 0.25 mile of Dean Creek runs through the Dawley Unit beginning at river mile 0.6 on the eastern boundary. The western half of the creek within Refuge boundaries is dominated by cascades (ranging from 1-6 feet tall) with a few small pools (<3 foot diameter) and averages 3 feet wide during a high flow period in late March 2011. Most of the small pools are ~1-1.5 feet deep; however there are a few larger pools that are deeper. The eastern half of the creek is primarily made up of riffles and widens to approximately 8 feet wide and is 1 foot deep on average during high flow periods. The banks of this creek are very steep and the substrate is primarily loose gravel covered by a thick layer of forest humus. According to the Elwha-Dungeness Watershed Plan (EDPU 2005), impassable fish barriers are located at river mile 0.5 and 1.2. The plan also notes that fish passage can be severely limited at the confluence with the bay during the spawning period due to extreme low flows which often go underground near the bay.

There are three families of amphibians endemic to the Northwest that breed and deposit eggs in small streams (less than 6 feet wide). Dean Creek has the potential to support four of these secretive species: Cope’s giant and Olympic torrent salamanders, and Cascades and coastal tailed frogs. These species require rocky, fast flowing streams that provide cool, oxygenated water and forested canopy cover that provides shade and leaf litter which nourishes aquatic insects. The creek supports coho and cutthroat trout. Unknown species of resident fish have been noted in the stretch of Dean Creek that runs through the Refuge (EDPU 2005). In addition, many other species of wildlife use riparian corridors for dispersal.

The objectives listed above are designed to improve instream water quality for resident fish and instream amphibians that can be found on Refuge lands as well as conditions encountered by anadromous fish that may use the creek as spawning habitat. Priority strategies include closing the main road at approximately mile point 0.95 and stabilizing a slide area that is located along the western boundary of this unit. Minimal to no forest management strategies will be recommended in the riparian area due to steep, unstable slopes. For more information on road closure and forest management, see Objective 1.2. Other important strategies include collecting data on the presence/absence of species in the instream habitat and delineating the immediate riparian habitat, which will then drive riparian habitat management.

Objective 3.3 Enhance and maintain the managed wetland on the Dawley Unit

Annually, enhance and maintain up to 0.39 acre within the freshwater impoundment on the Dawley Unit for the benefit of amphibians, bats, and other wildlife species. This impoundment will be managed for the following attributes:

- Up to 80% short emergent vegetation (e.g., *Scirpus*, *Carex*, and *Juncus*).
- <20% of tall emergent vegetation (e.g., cattail).
- 10% cover of partially submerged, downed woody debris along the shoreline .
- <30% cover of shrubs and trees on the shoreline (e.g., salmonberry, western redcedar, and western hemlock saplings).
- Absence of invasive and nonnative species (e.g., American bullfrogs and nonnative fish).

Strategies Applied to Achieve Objective

Management Strategies:

- a. Maintain water delivery system to impoundment.
- b. Map the bathymetry (i.e., delineate the benthic layer) of the impoundment.
- c. Install new water control structure and water gage.
- d. Maintain a minimum pool level but manage for optimum pool level and benthic layer characteristics for amphibian egg development from December through early May. This may involve shoreline contouring and water level control.
- e. Remove nonnative fish and American bullfrogs if detected.
- f. Manage emergent vegetation and partially submerged downed woody debris for egg attachment and concealment from predators (once key species are identified).
- g. Clear all woody vegetation on the dike along the southern edge of the impoundment to maintain structural integrity.
- h. Manage woody vegetation along the north, east, and western edges of the impoundment for optimal temperature and shading (once key species are identified through baseline surveys).
- i. Use appropriate IPM techniques including mechanical, physical, biological, and chemical methods (see Appendix G) to control invasive or undesirable species.

Monitoring Strategies (see also Goal 4):

- j. Invasive species monitoring. See Appendix G.

k. Conduct hydrological assessment of relationship between impoundment and domestic water source (spring box).

l. Collect baseline data on the distribution and abundance of amphibians and bats.

Rationale: The previous land owner developed the impoundment for fire suppression, irrigation, and waterfowl use. Along with the donation of the land came the owners' existing water rights to Dean Creek. Since this property was donated to the Refuge, staff has exercised these rights by utilizing the existing water delivery system to the impoundment for similar purposes. This involves maintaining water levels to a maximum depth of 7 feet year-round. This objective will alter the primary purpose to providing amphibian habitat, which will entail varying and lowering water levels depending on the species encountered.

In Washington, 46% of native amphibians are considered of special concern and many species of concern are forest-dependent species that have become locally extinct (Blaustein et al. 1995). Numerous amphibians are long-lived and reach sexual maturity after years of growth. Their dispersal or migration distance is limited to the immediate area around their breeding ponds, streams, or forests. Loss of habitat, habitat degradation, and fragmentation all pose serious threats to amphibians. Because their skins are permeable, amphibians are more susceptible to habitat degradation through pollution and changes in air, water, and soil moisture as well as temperature than most forest species. Many amphibians are particularly sensitive to UV-B exposure with potential effects including mortality, slowed growth, or deformities (NatureServe 2011). As a result, they are highly susceptible to climate change and the effects may be exacerbated due to their limited dispersal distance. In addition, they typically require more than one habitat type for their life history needs. For instance, many amphibians lay their eggs in ponds, the larva develop and then metamorphose in those same ponds. They then spend their adult life in the forests within a ½ mile of those ponds, returning in later years to lay eggs and the cycle continues. Thus, providing suitable habitats in close proximity is important, particularly to maintaining adult survival.

This objective is intended to provide freshwater wetland in forested habitats in an area that is lacking in this important resource (<1.5% of the land area in Sequim Bay Watershed is listed as freshwater wetland). The primary benefiting species include 7 species of amphibians that may use the impoundment during all or a portion of their life cycle. Forest bats may also benefit as this type of habitat provides suitable foraging habitat. Improved management of the impoundment for the benefit of amphibians will allow us to provide habitat free of nonnative predators (i.e., American bullfrogs and fish) in an area where pollution and human use can be limited. This may become increasingly important as the myriad of effects of climate change become apparent. The strategies are designed to first collect baseline data on amphibian presence/absence and diversity as well as hydrologic information for use in determining optimum (most suitable level to sustain populations) and conservation (minimal level to sustain populations) pool levels. Management actions will be dependent on species found and may include installation of a water control structure and contouring of the benthic layer, if necessary, to assure that a conservation pool level can be provided. A 30- to 50-foot woody and herbaceous vegetative buffer with a down woody component will be maintained around the shoreline to provide cover from predators and maintain moisture levels. An additional buffer will be established for use during active forest management to minimize disturbance and siltation due to management actions (see Objective 1.2).

2.4.4 Goal 4. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions under objectives for Goals 1-3.

<p>Objective 4.1 Conduct and facilitate surveys</p> <p>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 in Goals 1-3 in this CCP. These surveys have the following attributes:</p> <ul style="list-style-type: none"> • Data collection techniques will likely 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 for identification and/or experimentation in order to minimize long-term or cumulative impacts. • 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. Conduct regular invasive species surveys to guide IPM (see all Objectives for Goals 1-3).</p>
<p>b. Annually monitor for derelict gear and/or creosote-covered log deposition in nearshore habitats (see Objectives 2.2-2.5).</p>
<p>c. Continue to collect data from bird counts (Christmas Bird Count, breeding bird surveys, and Mid-winter Waterfowl, overwintering and migrant shorebird surveys) on the Dungeness Unit (see Objectives 1.1, 2.2, 2.3).</p>
<p>d. Conduct periodic surveys in the forested habitat on the Dawley Unit to assess the success of forest management (e.g., bat, amphibian and vegetative surveys, etc.; see Objective 1.2).</p>
<p>e. Determine frequency of survey effort and monitor the distribution and density of common eelgrass on the Refuge (see Objective 2.4).</p>
<p>Rationale: National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-ee) requires that refuges “monitor the status and trends of fish, wildlife, and plants in each refuge.” Surveys will be used primarily to evaluate resource response to and assess progress toward achieving Refuge management objectives (under Goals 1-3 in this CCP) derived from the NWRS Mission, Refuge purpose(s), and maintenance of biological integrity, diversity, and environmental health (601 FW 3). Determining resource status and evaluating progress toward achieving objectives is essential to implementing adaptive management on Department of Interior lands as required by policy (522 DM 1). Specifically, results of surveys will be used to refine management strategies, where necessary, over time in order to achieve resource objectives. Surveys would provide the best available scientific information to promote transparent decision-making processes for resource management over time on Refuge lands.</p>

Objective 4.2 Conduct and facilitate 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. Research also will reduce uncertainty regarding wildlife and habitat responses to Refuge management actions in order to achieve desired outcomes reflected in resource management objectives and to facilitate adaptive management. These research projects 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 likely 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. Work with partners to study environmental factors that are climate change related stressors (e.g., accelerated erosion due to sea level rise, increased frequency and severity of storm events, and/or erosion induced by excessive surface water runoff) on nearshore habitats of Dungeness and Graveyard spits (see Objectives 2.1-2.5).

b. Work with partners to study aspects of mudflat habitat quality (e.g., macro- and micro-invertebrate abundance and distribution; water quality; and forage fish abundance and distribution; see Objective 2.3).

c. Continue existing research projects (e.g., Caspian tern colony productivity; sediment dynamics at the base of Dungeness Spit and large woody debris monitoring in conjunction with Elwha nearshore habitat studies) through to agreed-upon end dates.

d. Study the value of salt marsh habitat on Graveyard Spit RNA as a nursery area for crab and other wildlife (see Objective 2.5).

e. Study key ecological attributes of salt marsh habitat (hydrological flows and tidal elevation/cycles) and their effects on sedimentation rates (accretion/erosion) as well as driftwood recruitment (see Objective 2.5).

f. Study microhabitat characteristics (e.g., species, percent cover) to track changes in distribution and diversity of plant species in the Graveyard Spit RNA (see Objective 2.2).

g. Track common eelgrass distribution and density (see Objective 2.4).

Rationale: Research projects on Refuge lands will address a wide range of natural and cultural resource as well as public-use management issues. Examples of research projects include habitat use and life-history requirements for specific species/species groups, practical methods for habitat management and restoration, extent and severity of environmental contaminants, techniques to control or eradicate pest species, effects of climate change on environmental conditions and associated habitat/wildlife response, identification and analyses of paleontological specimens, modeling of wildlife populations, and assessing response of habitat/wildlife to disturbance from public uses. Projects may be species or Refuge specific, or evaluate the relative contribution of the Refuge to larger landscape (e.g., ecoregion, region, flyway, national, international) issues and

trends. 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.

Objective 4.3 Conduct and facilitate scientific assessments

Throughout the life of the CCP, conduct scientific assessments to provide baseline information to expand knowledge regarding the status of Refuge resources to better inform resource management decisions. These scientific assessments will contribute to the development of Refuge resource objectives and they will also be used to facilitate habitat restoration through selection of appropriate habitat management strategies based upon site-specific conditions.

- 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. Conduct forest assessment on the Dawley Unit (e.g., percent canopy closure, tree species, understory species, DBH of live trees, DBH and height of snags, snag density; see Objective 1.2).

b. Conduct baseline forest inventory on the Dungeness Unit (see Objective 1.1).

c. By 2018, collect baseline data on the distribution and abundance of amphibians and bats that are using forested and wetland habitats on the Dungeness and Dawley units (see Objectives 1.1, 1.2, 3.1, 3.2, 3.3).

d. Assess the distribution and abundance of Lepidopterans (i.e., sand-verbena moth and Taylor’s checkerspot) on Graveyard and Dungeness spits (see Objective 2.2).

e. Assess the number of breeding pairs in the gull colony at the tip of Graveyard Spit (see Objective 2.5).

f. By 2013, assess instream habitat for anadromous fish suitability and collect baseline data on presence/absence of fish and instream amphibians (see Objective 3.2).

g. Conduct a wetlands inventory (Dawley Unit) and hydrological assessment (Dawley and Dungeness units) by 2015 (see Objectives 3.1-3.3).

h. Conduct road inventory and condition assessment (Dawley Unit) by 2016 (see Objective 1.2).

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) that are necessary to ensure that implementation of on-the-ground resource management achieve resource management objectives identified under Goals 1-3.

2.4.5 Goal 5. Visitors feel welcomed and know they are on a national wildlife refuge as well as where they can safely explore and learn more about the diversity of wildlife, while being good wildlife stewards. As a result, visitors will have a memorable experience and leave the Refuge with a greater connection between themselves and nature.

Objective 5.1 Enhance visitor orientation
Throughout the life of the CCP, provide visitors of all ages and abilities an integrated setting of welcome and orientation facilities and programs. Successful visitor orientation at the Refuge is characterized by: <ul style="list-style-type: none"> • >75% of visitors greeted at entrance. • 100% of Refuge visitors know they are on a national wildlife refuge and that Dungeness Spit is part of the Refuge. • >95% of Refuge visitors understand that “wildlife comes first” on wildlife refuges, recognize that humans and pets disturb wildlife and their habitat, and can identify at least one negative impact from human/pet disturbance. • >95% of Refuge visitors know how to minimize wildlife disturbance by practicing proper trail etiquette. • >50% of visitors know there are other refuges in the Washington Maritime National Wildlife Refuge Complex and where to find information about those refuges including the complex headquarters location and additional information about Dungeness NWR.
Strategies Applied to Achieve Objective
Management Strategies:
a. Volunteers welcome and orient visitors at the entrance station during the peak visitation season (April 1-September 30). Increase volunteer time to 1,200 hours per year.
b. Staff members welcome and orient visitors. Increase staff time to 520 hours per year.
c. Maintain signs to greet and inform visitors.
d. Continue to use and maintain interpretive materials including display panels and brochures.
e. Develop trail etiquette materials.
f. Replace existing signage with a new Refuge map and regulations panel at Cline Spit boat launch.
g. Replace existing signage with a new Refuge map and regulations panel at Dungeness Landing boat launch.
Monitoring Strategies:
h. Track volunteer and staff hours spent welcoming and orienting visitors.
i. Informal visitor contact and tracking to determine percentage of visitors.
Rationale: The Dungeness NWR is one of the busiest refuges in the region. Trained volunteer greeters can disseminate information about Refuge purposes and resources and are an effective means to actively engage with the public. Using volunteer greeters during the busiest visitation times—April 1 to September 30—can augment the passive orientation signs, interpretive materials, and staff presence. Greeters may also be effectively used during busy winter holiday weekends, as well. In less busy times, interpretive signage and displays continue to provide visitors with a passive opportunity for orientation and learning. Using trained greeters creates a valuable opportunity to teach visitors about the Refuge and the Refuge System, including how to be good resource stewards and how to minimize human impacts on wildlife. Trail etiquette materials would provide Refuge visitors guidelines on how to minimize wildlife disturbance.

<p>Objective 5.2 Manage Refuge access</p> <p>Throughout the life of the CCP, allow managed foot and motorized and nonmotorized boat access to Dungeness NWR so that people of all ages and abilities may learn about and experience Refuge wildlife and habitats while minimizing adverse impacts to Refuge resources. Ideal Refuge visitor access understanding is characterized by:</p> <ul style="list-style-type: none"> • 100% of the Refuge’s pedestrian visitors knowing and using only open access points. • >95% of the Refuge’s boating visitors knowing and using only open access points to the Refuge and 100% compliance with shoreline buffers.
<p>Strategies Applied to Achieve Objective</p>
<p>Management Strategies:</p>
<p>a. Provide areas where visitors of all ages and different abilities can experience Refuge wildlife (Forested uplands and Zones 1-3 and 5).</p>
<p>b. Provide a year-round 100-yard boat landing area at the New Dungeness Light Station by reservation only. Limited to 20 boat landings per day. Boat landing hours limited to 9am to 5pm.</p>
<p>c. Maintain seasonal opening for public access along the first ½ mile of Dungeness Spit from May 15 to September 30 (Zone 2, Harbor side).</p>
<p>d. Provide seasonal openings for boat access to Refuge waters and tidelands from May 15 to September 30 (Zone 5).</p>
<p>e. Maintain public access closures including west bluffs, upland forest (except established trails), and all of Zone 4.</p>
<p>f. Continue temporary closures in portions of high-use areas when seal pups are present.</p>
<p>g. Replace existing signage with a new Refuge map and regulations panel at Cline Spit boat launch.</p>
<p>h. Replace existing signage with a new Refuge map and regulations panel at Dungeness Landing boat launch.</p>
<p>i. Maintain signs on pilings at Refuge water boundaries.</p>
<p>j. Maintain signs at Refuge boundaries and at closed areas.</p>
<p>k. Add regulation signage at lighthouse, lighthouse boat landing zone, and end of Dungeness Spit.</p>
<p>Monitoring Strategies:</p>
<p>l. Informal contact and tracking to determine compliance with access.</p>
<p>m. Number of access violations.</p>
<p>n. Number of boat landings at lighthouse compared with number of reservations.</p>
<p>Rationale: Dungeness Bay and Dungeness Harbor are very busy with commercial fishing and recreational boating activity. Both user groups tend to access the Refuge at areas that are not open to boat access. Increasing signage and information about appropriate and allowable means of accessing the Refuge would support the “Wildlife First” mandate while allowing access to the Refuge without causing unnecessary damage or disturbance. Many of our partners have identified human disturbance as a pervasive and serious threat to wildlife and their habitats (WDFW 2005, Mills et al. 2005, Rojek et al. 2007, Tessler et al. 2007, USFWS 2005b). Refuge visitation ranged from 76,000 to 80,000 visitors per year for the last five years. The majority of use occurs primarily May-September. This level of visitation in open areas or illegal trespass into closed areas cause stress and reduced productivity of wildlife on the Refuge. Pacific harbor seals that are pupping in open areas are vulnerable to human-caused disturbance particularly because peak pupping periods coincide with periods of high visitation (Boren et al. 2003, Sanguinetti 2003). Disturbance can reduce fitness or increase mortality, especially during molt or nursing. Several studies have noted that pinnipeds have a disproportional, negative response to approaches by kayaks in contrast to other recreational vessels (Szanişzlo 2001, Grella et al. 2001) potentially due to the stealthy, low profile approach of a kayak. In addition, human disturbance can displace overwintering dunlin and</p>

brant. Human disturbance also affects nearshore habitats. Public use closures protect the integrity of habitat and reduce introduction of invasive species. For example, Graveyard Spit is closed to protect fragile strand plant communities from trampling, inadvertent introduction of invasive plant species, and illegal fires. In addition, the majority of invasive plant species on this Refuge can be found within the area surrounding the New Dungeness Light Station and an abandoned Navy facility on Graveyard Spit, areas of historically high public use.

While it is important to have undisturbed areas for wildlife to rest and feed, it is also important for visitors to experience and learn about Refuge wildlife. There are opportunities to allow access to less-sensitive habitats and/or habitats at less-sensitive times of the year.

The designated boat landing area on the beach directly south of the New Dungeness Light Station is the only place boats are allowed to land in the Refuge and is intended to provide visitors who wish to visit the historic lighthouse with an alternative to hiking the spit. It also provides lighthouse access at high tide when hiking the Dungeness Spit may not be practical and an alternative for those who are unable to make the 11-mile round trip hike. It is not intended to be an alternate access point for the Dungeness Spit and areas adjacent to the landing are closed to reduce wildlife disturbance. The lighthouse is open to visitation from 9am to 5pm daily; consequently, boat landings on the Refuge are limited to the same times. This restriction is not intended to apply to the USCG or others during emergencies or other coordinated activities.

This objective supports continued access for Tribes to exercise their adjudicated treaty rights.

Objective 5.3 Improve compliance with Refuge regulations

The purpose of Refuge regulations is to protect human health and safety, wildlife, and habitat. Throughout the life of the CCP, enhance Refuge visitors’ understanding and compliance of Refuge regulations. Visitor understanding would be exhibited by:

- Decreasing the occurrence of violations observed or reported by 50% over the next 5 years.
- Pet owners being 100% compliant with the no-pets-allowed regulations.
- Zero occurrences of trespassing on bluffs.
- Zero occurrences of inappropriate and incompatible recreational uses (e.g., kite-flying, jet skiing, wind surfing, ball/Frisbee tossing, camping, campfires, after hours trespass, etc.).

Strategies Applied to Achieve Objective

Management Strategies:

- a. Maintain existing regulatory and guidance signs.
- b. Replace regulatory and guidance signs at lighthouse boat landing and end of Dungeness Spit.
- c. Provide information about Refuge regulations at trailhead kiosks (e.g., tear sheets, map panels, and Refuge brochures).
- d. Increase law enforcement patrols (deterrents, warnings, citations).
- e. Staff, volunteer greeters, and trail rovers provide information to visitors.
- f. Formalize Refuge-specific public use regulations.

Monitoring Strategies:

- g. Informal contact and tracking to determine compliance with Refuge regulations.
- h. Number of violations.
- i. Number of staff-hours dedicated to ensuring visitor compliance with Refuge regulations (e.g., law enforcement patrols, visitor contacts).

Rationale: The Dungeness NWR is situated adjacent to a County recreation area and visitors do not always understand when they are using the County park/recreation area versus the Dungeness

NWR. Therefore, visitors do not always recognize when they have entered an area in which wildlife is the highest management priority, as opposed to recreation. Clearly communicating Refuge regulations contributes to the objective of protecting both human health and safety as well as protecting wildlife and habitat from disturbance. In addition, a greater understanding and appreciation of Refuge resources can ensure that visitors have the least amount of impact on wildlife. Providing safe Refuge access and minimizing wildlife and habitat disturbance is expected to contribute to a high-quality visitor experience.

2.4.6 Goal 6. Visitors have the opportunity to participate in safe, quality wildlife-dependent recreation programs and compatible nonwildlife-dependent recreation activities while minimizing wildlife disturbance in the face of increasing Refuge visitation. Programs and activities, including interpretation, environmental education, wildlife observation and photography, and fishing, will focus on enhancing public understanding and appreciation of wildlife and cultural resources while building support for the Refuge.

Objective 6.1 Provide high quality interpretation of Refuge habitats and processes
Actively and passively interpret Refuge habitats and processes for the public throughout the life of the CCP so that the following objectives are met: <ul style="list-style-type: none"> • >60% of Refuge visitors can name the main habitat types associated with the Refuge’s shoreline, coastal forest, and bay (eelgrass beds) areas. • >50% of Refuge visitors can name at least one species associated with each Refuge habitat type. • >40% of visitors are aware of the Refuge’s unique geomorphology • >40% of visitors can identify at least one potential impact to the Refuge as a result of climate change
Strategies Applied to Achieve Objective
Management Strategies:
a. In coordination with partners, develop new interpretive panels at lighthouse.
b. Maintain and update Refuge interpretive brochures, as necessary.
c. Create at least one permanent interpretive product that includes Refuge-specific climate change information.
d. Use trained and/or subject matter expert volunteers to present programs and/or information about the resources and processes of the Refuge.
e. Develop and present 2-5 interpretive programs per year focusing on Dungeness NWR wildlife and habitats, Dungeness Spit geomorphology, and Refuge-related cultural resources.
f. Create an environmental education/outreach specialist position and offer guided interpretive programs.
Monitoring Strategies:
g. Informal visitor contacts and tracking.
h. OMB-approved survey.
Rationale: There are tremendous opportunities to teach visitors about the Refuge and its wildlife resources in an informal setting, outside of formal education programs. Doing so can instill a greater appreciation for the Refuge, its wildlife, and their habitats. An additional staff member would develop, facilitate, and coordinate interpretive programs. In addition, the greater Sequim

community includes many habitat- and resource-specific specialists that regularly engage their expertise with the Refuge. It is a region that attracts a disproportionately high number of retirees from the environmental and resource management or education fields. The Refuge can capitalize on these relationships to enhance interpretive programs.

Objective 6.2 Provide high quality interpretation of human history

Human history is an important part of the Salish Sea including both Native American presence and early European exploration and settlement of the Dungeness area. Visitors to the Refuge can enhance their awareness and understanding of local history through self-guided and Refuge-led interpretation provided throughout the life of the CCP. To meet this objective:

- >70% of visitors would know that Native Americans have inhabited the area and used its resources since prehistoric times and that they continue to use Refuge waters and tidelands to harvest aquatic resources.
- Visitors know that early European exploration and settlement of the Salish Sea and its shores brought dramatic change to the area.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Partner with interested Tribe(s) to deliver education, interpretation materials, and 1 interpretation program per year that focus on Refuge and area Native American culture.
- b. Annually provide at least 1 Refuge interpretive product(s) or program(s) that focus primarily on the general human history of the area.
- c. All appropriate Refuge educational products include interpretation of cultural resources.

Monitoring Strategies:

- d. Number of interpretive products or programs provided per year.
- e. Informal visitor contacts and tracking.

Rationale: Although the Refuge is managed for wildlife first, it is also important for visitors to understand the human history and its influence upon the lands and waters of the Salish Sea. Native Americans continue to have and exercise treaty rights to harvest resources in the Salish Sea, including in/on Refuge-managed waters and tidelands.

Objective 6.3 Provide high quality interpretation of the New Dungeness Light Station and maritime history

Throughout the life of the CCP, promote high quality interpretive opportunities for visitors to enjoy and appreciate the New Dungeness Light Station and its important role in maritime history. To meet this objective:

- >50% of visitors would know that the New Dungeness Light Station is more than 150 years old.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Partner with the New Dungeness Light Station Association (NDLSA), USCG, and others to provide opportunities to learn about the lighthouse.
- b. Continue to provide a designated boat landing area near the lighthouse.
- c. Volunteers provide basic information about the light station and inform visitors how to access the light station.
- d. Continue to allow NDLSA motorized vehicle access to the New Dungeness Light Station facilities for the purpose of volunteer lighthouse keeper exchanges and facilities maintenance as specified in an MOU between the NDLSA and the Refuge.

e. Continue to coordinate with USCG to allow Aids to Navigation maintenance personnel motorized access for lighthouse servicing and repair.
f. In the event that the USCG declares the light station property excess to its needs, the Service will work with the USCG to bring the light station property into the Refuge System and enter into formal agreement with NDLSA to continue to manage and maintain the light station facilities.
Monitoring Strategies:
g. Informal visitor contact and tracking.
Rationale: The New Dungeness Light Station was first lit in 1857 and was the second lighthouse established in the Washington territory. Consequently, the Service and its partners aim to inform visitors about the historic and present significance of the light station.
There are two ways to access the light station: by foot and boat. Strategies under this objective support the continued maintenance of the designated boat landing at the light station to accommodate access by boaters. The light station facilities are currently owned by the USCG and managed and maintained by the NDLSA. The Refuge is interested in acquiring the light station facilities when the USCG is prepared to excess them. The Refuge recognizes the NDLSA as an important and valued partner and would be interested in NDLSA continuing to manage and maintain the light station. The Refuge’s interest is in the wildlife value of the overall property within the Refuge setting and recognizes there is also an important cultural value to be maintained, including its role as an iconic symbol of the area.

Objective 6.4 Enhance environmental education programs
Throughout the life of the CCP, provide quality environmental education programs to community groups and schools. Through the Refuge environmental education program, instill a stewardship value in program participants exhibited by the following characteristics: <ul style="list-style-type: none"> • >90% of environmental education program participants learn that the main habitat types associated with the Refuge are shoreline habitat, coastal forest habitat, and eelgrass beds (bay) habitat. • >80% of environmental education program participants can name at least one species associated with each habitat type. • >80% of environmental education program participants know how the spit is formed (Refuge geomorphology). • >80% of environmental education program participants know at least one potential impact of climate change to the Refuge.
Strategies Applied to Achieve Objective
Management Strategies:
a. Facilitate other organizations’ abilities to teach students about Refuge resources (e.g., permits and fee waivers, environmental education material packets, teacher training programs, etc.).
b. Develop partnerships with universities, the Friends of Dungeness NWR, and other interested organizations to provide educational materials and programs about the geomorphology of the Refuge and regional issues associated with climate change.
c. Create an environmental education/outreach specialist position and offer education programs to primary and secondary level school groups on and off the Refuge.
Monitoring Strategies:
d. Post-program student assessment/evaluation.
Rationale: The Refuge is an ideal outdoor classroom where students have the opportunity to experience focused study of a variety of interdependent habitats and their associated wildlife, the unique geomorphology of the area, and the potential impacts of climate change on a coastal

environment. Cultural history can also be incorporated into environmental education programming. Cultural history as explored in the setting of a wildlife refuge is about how people have interacted with, shaped, and been influenced by the environment (e.g., native uses of plants for food, shelter, and tools; the cultural significance of certain animal species for food, identity, etc.; and traditional management and/or harvesting activities such as fish weirs or controlled burning) (also see Objective 8.2).

Learning about the Refuge can instill a sense of stewardship among students and foster a greater appreciation for the National Wildlife Refuge System. Because Refuge staff and funding resources are limited, the Refuge can benefit from increased staff and partnering with other organizations to deliver the environmental education programs. The Refuge environmental education program can augment other institutions' programs by providing a real-world situation in which to observe textbook learning.

Objective 6.5 Promote opportunities for wildlife observation and photography

Throughout the life of the CCP, promote opportunities in which visitors can observe and photograph Refuge wildlife and habitats, especially species for which the Refuge is important (e.g., brant, bald eagles, and shorebirds, etc.). A quality experience would be exhibited by:

- >80% of the visitors seeking to observe and photograph Refuge wildlife knowing what species might be observed on the Refuge.
- >50% of visitors to the Refuge knowing when (seasonally and temporally) and where the best wildlife viewing opportunities are and how to maximize those opportunities.
- >90% of visitors to the Refuge knowing how to observe wildlife without causing disturbance to the wildlife or its habitat features.

Strategies Applied to Achieve Objective

Management Strategies:

- a. Maintain observation decks with viewing scopes.
- b. Use volunteer greeters as a resource to inform visitors of recent wildlife sightings and potential observation locations.
- c. Maintain wildlife checklist for the Refuge.
- d. Update and enhance wildlife checklist to include habitat associations for various species groups.
- e. Maintain Refuge brochure to include wildlife observation areas including species and habitat type associations.
- f. Partner with interest groups to develop ≥ 5 wildlife observation walking tours with naturalists per year.
- g. Seasonal wildlife identification guide exhibit.
- h. Recreational beach use incidental to wildlife observation and photography allowed from west Refuge boundary to ½ mile (Zone 1 and Strait side of Zone 2). Permitted activities are defined as: wading, picnicking and sunbathing.
- i. Horseback riding incidental to wildlife observation and photography allowed on west beach (Zone 1) with stipulations if a safe and legal alternate access route can be obtained from the west or from the east of the Refuge. If an alternate route is obtained from the east then horseback use of the administrative road from the gate separating the Refuge from the private landowner to the east will also be allowed. Horseback riding will be by advance reservation only. Party size will be limited to no more than 4 horses to prevent resource damage, overcrowding and ensure public safety. Allowed daily, October 1-March 31, and weekdays, April 1-September 30. No horseback riding on Memorial Day, the Fourth of July, and Labor Day. Horses must walk (no trotting, cantering, or galloping). Pedestrians have right-of-way.

j. Jogging allowed only on west beach (Zone 1) and on the trail adjacent to the Refuge parking lot. Use is limited to daylight hours only. Organized running groups and running events will be prohibited. Groups will be limited to 3 people or less along the parking lot trail.

Monitoring Strategies:

k. Informal visitor contacts and tracking.

l. Number of violations (nonpermitted recreational activities and permitted activities outside of allowed beach use area).

Rationale: As two of our six priority wildlife-dependent public uses, wildlife observation and photography are important Refuge activities. Visitors' can be enhanced if they know where and when to observe particular species. Providing visitors up-to-date information and wildlife viewing tips can enhance their success in enjoying this activity on the Refuge. Enjoying these activities with a naturalist can also increase visitor knowledge and appreciation of Refuge wildlife resources. Naturalist guides can also broaden visitor understanding about how to reduce human disturbance to wildlife and how that enhances the viewing experience.

Within this CCP process, existing public use activities were re-evaluated based on the refined criteria outlined under the appropriateness and compatibility policies. Our analysis has found that both horseback riding and jogging are appropriate and compatible activities when performed under certain stipulations (see Appendix B, Compatibility Determinations).

While not one of the six wildlife-dependent public uses listed or identified in the National Wildlife Refuge System Administration Act, as amended (1997), horseback riding on the Dungeness NWR can facilitate wildlife observation. Allowing use on only the west beach (Zone 1) should reduce conflicts between user groups as this area historically sees limited public use. Although horseback riding can result in disturbance to wildlife, disturbance is expected to be intermittent and short-term and limited in time and space. There is more than an adequate amount of undisturbed habitat available to the majority of wildlife for escape and cover.

Although jogging is not a wildlife-dependent public use of the Refuge, it is likely that some joggers observe and enjoy wildlife while on the Refuge. Occasional use of the west beach and trail adjacent to the parking lot is expected to have negligible impacts on wildlife or wildlife-dependent public uses. Potential for wildlife disturbance is minimal given the low level of use by wildlife and Refuge visitors in these areas. In addition, conflicts between joggers and wildlife-dependent public uses are expected to be low due to the low use of the west beach and trail adjacent to the parking lot by wildlife and subsequent low expectations of visitors to encounter wildlife in these areas.

Objective 6.6 Provide opportunities for quality fishing and shell-fishing

Throughout the life of the CCP, provide opportunities for visitors interested in fishing and shell-fishing to enjoy those activities with minimal disturbance to Refuge wildlife. Success would be exhibited by:

- Boaters remaining 100 yards away from the mean high tide line and observing the no-wake regulation.
- Anglers and shell fishers knowing and complying with fishing and shell-fishing access and harvest areas identified in Refuge-specific regulations.

Strategies Applied to Achieve Objective

Management Strategies:

a. Continue to provide seasonal access to Refuge waters and tide flats.

b. Install a Refuge map and regulations panel at Cline Spit and Dungeness Landing.

c. Maintain signs on pilings at Refuge water boundaries.
d. Partner with WDFW to include Refuge-specific fishing/shell-fishing information in the State fishing regulations pamphlet.
Monitoring Strategies:
e. Number of observed violations.
Rationale: The Refuge currently has few visitors that engage in fishing and shell-fishing activities because other higher-quality experiences are available nearby. The State manages harvest limits and seasons; the Refuge can provide access to fishing/shell-fishing for those visitors that are interested in this activity on the Refuge. Depending upon wildlife disturbance concerns during the State harvest seasons, the Refuge maintains the management option to limit access to fishing/shell-fishing areas located within the Refuge boundary.

2.4.7 Goal 7. Through Refuge outreach efforts local residents will have the opportunity to gain an understanding of and appreciation for the Refuge and Refuge System mission.

Objective 7.1 Conduct community outreach
Throughout the life of the CCP, conduct outreach to the public in an effort to promote understanding and awareness of the Dungeness NWR within the North Olympic Peninsula community. Desired outcomes are characterized by: <ul style="list-style-type: none"> • >90% of government and tribal officials, local citizens, and visitors to the area knowing of the Dungeness NWR and that it provides key habitat for a variety of wildlife, including migrating birds and marine mammals. • >80% of government and tribal officials and local citizens understanding the conservation mission of the National Wildlife Refuge System. • >90% of area boaters recognizing Dungeness Spit is a NWR and staying 100 yards from the mean high tide line to avoid disturbances to wildlife and their habitats. • >90% of airplane pilots knowing where the Dungeness NWR is located and maintain a 2,000-foot minimum ceiling above the Refuge. • Increased accuracy of local news articles about the Refuge and increased contact with local news sources by a Refuge media liaison.
Strategies Applied to Achieve Objective
a. Develop and distribute media packets to local news sources.
b. Increase media contact by the Refuge media liaison to improve communication conduits and information accuracy.
c. Publish >2 articles in local publications per year.
d. Deliver >5 presentations to local organizations per year.
e. Attend 3 community events per year and display Refuge exhibits and information.
f. Specifically target 2 media articles toward the boating and aviation communities per year.
g. Continue to work with the Friends Group to provide public outreach.
h. Work with the Friends Group to recruit volunteer speakers to give presentations to groups on behalf of the Refuge.
i. Routinely upgrade and improve Refuge website content, and add links to partners and other resources.
Rationale: Community outreach efforts can promote greater understanding and appreciation of the Refuge and the NWRs and can result in lower impacts to wildlife resources through increased visitor compliance.

Objective 7.2 Continue recruiting, training, retaining, and utilizing volunteers for support of Refuge programs and activities.

Build volunteer participation so that within 7 years, more than 150 active and engaged volunteers regularly participate in Refuge programs and projects on a recurring basis annually.

Strategies Applied to Achieve Objective

- a. Continue to work with the Friends Group to provide volunteer opportunities. Increase number of regularly participating volunteers to 150 per year.
- b. Conduct 7 beach clean-ups per year.
- c. Effectively utilize volunteers to orient visitors, maintain facilities, monitor invasive species, control invasive plants, assist with biological program, and conduct community outreach.
- d. Host 2-4 full-time volunteer caretaker(s).
- e. Replace volunteer cabin on Dungeness Unit.
- f. Provide annual new volunteer training.
- g. Provide 2 returning volunteer orientations.
- h. Provide >5 additional training opportunities to volunteers (e.g., project-specific, Refuge resources, area history, cultural resources, geology, etc.).

Rationale: The Refuge relies heavily on volunteers to serve as visitor contacts, assist with habitat projects, maintenance, and invasive species monitoring and control activities. Annually, volunteers contribute as many hours as full-time staff. Currently, the number of volunteers that participate on a recurring basis is estimated at 100. These repeat volunteers have an excellent knowledge of the Refuge and its resources, and often add value to the programs by working on more than one project and have a better understanding of the resource. For example, in recent years volunteers working on Feeder Watch and Christmas Bird Count also worked at the entrance station greeting visitors. Increasing this core of dedicated repeat volunteers would provide major benefits to both habitat management and public use programs.

2.4.8 Goal 8. Protect, preserve, evaluate and interpret the cultural heritage and resources of the Refuge while consulting with appropriate Native American groups and preservation organizations, and complying with historic preservation legislation.

Objective 8.1. Implement a proactive cultural resource program.

Throughout the life of the CCP, implement a proactive cultural resources management program that focuses on meeting the requirements of the National Historic Preservation Act, including consultation, identification, inventory, evaluation, and protection of cultural resources.

Strategies Applied to Achieve Objective

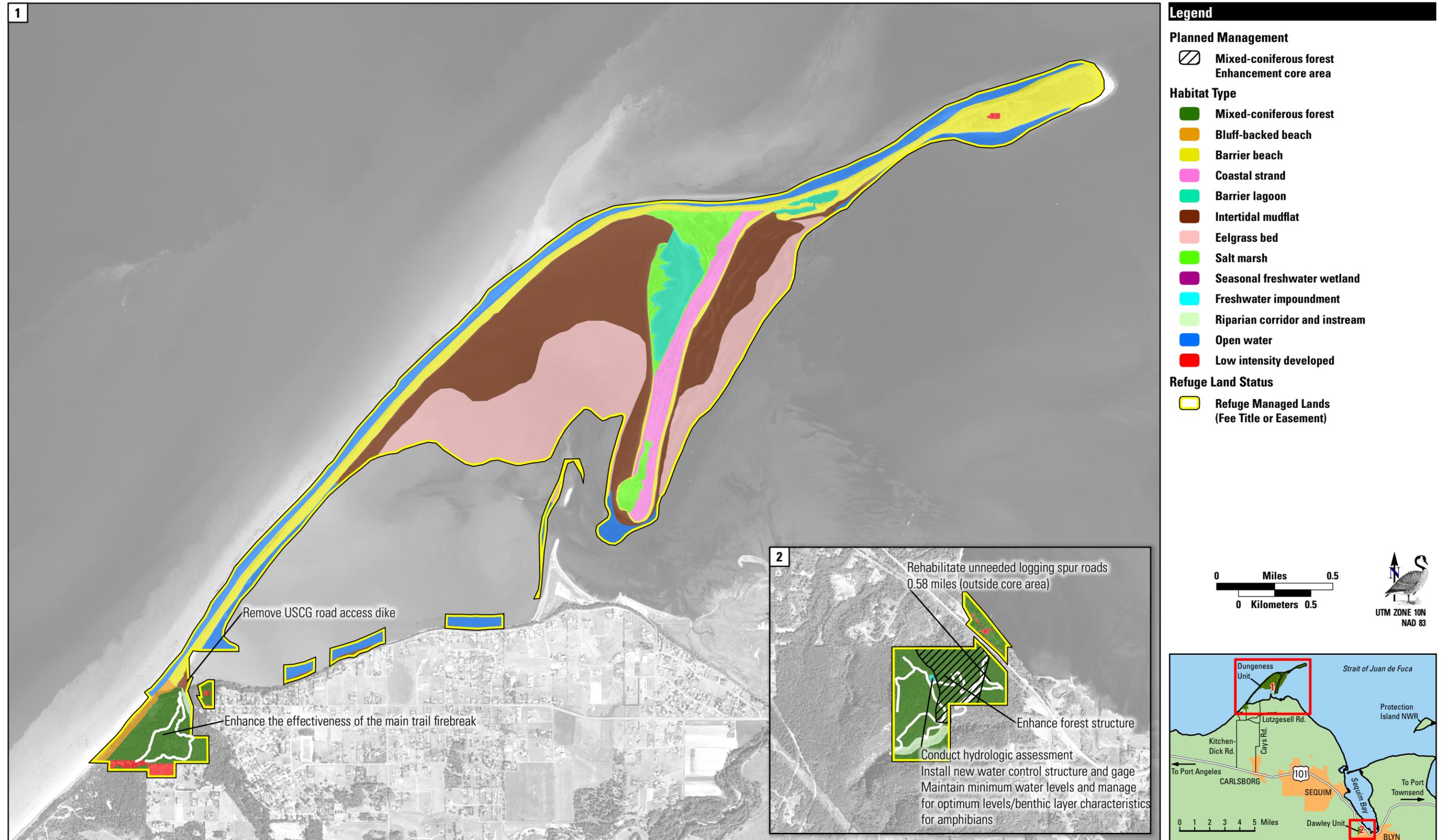
- a. Identify archaeological sites that coincide with existing and planned roads, facilities, public use areas, and habitat projects. Evaluate threatened and impacted sites and structures for eligibility to the National Register of Historic Places. Prepare and implement activities to avoid and mitigate impacts to sites and structures as necessary.
- b. Conduct systematic documentation and evaluation of historic buildings.
- c. Implement a proactive historic preservation program to evaluate eligibility to the National Register of Historic Places of those archaeological sites and historic-era structures that may be impacted by Service undertakings, management activities, erosion, or neglect.
- d. Develop a GIS layer for cultural resources that can be used with other GIS layers for the Refuge, yet contains appropriate locks to protect sensitive information.
- e. Develop partnerships with the Tribes for cultural resources inventory, evaluation, and project

monitoring, consistent with the regulations of the National Historic Preservation Act.
Rationale: Various federal historic preservation laws and regulations require the Service to implement the kind of program described under this objective.

Objective 8.2 Develop a cultural resources education and interpretation program.
 Develop, in partnership with the Tribes and other preservation partners, a program for the education and interpretation of cultural resources of the Refuge throughout the life of the CCP.
Strategies Applied to Achieve Objective
 a. Prepare interpretive media (e.g., pamphlets, signs, exhibits) that relate the cultural resources.
 b. Work with partners to prepare cultural/historical educational materials for use in Refuge environmental education program.
 c. Consult with the Tribes, historical societies, and other preservation partners to identify the type of cultural resources information appropriate for public interpretation.
 d. Develop an outreach program and materials so that the cultural resource messages become part of cultural events in the area, including National Wildlife Refuge Week and appropriate local festivals.
 e. Develop Museum Property Inventory. Create storage and use plans for museum property as part of the outreach program.
Rationale: Cultural history as explored in the setting of a wildlife refuge is about how people have interacted with, shaped, and been influenced by the environment and include uses of plants for food, shelter, and tools; the cultural significance of certain animal species for food, identity, etc.; and traditional management and/or harvesting activities. Cultural resources are not renewable. Thus, interpretation of cultural resources can instill a conservation ethic among the public and others who encounter or manage them. The goals of the cultural resource education and interpretive program are fourfold: (1) translate the results of cultural research into media that can be understood and appreciated by a variety of people, (2) relate the connection between cultural resources and natural resources and the role of humans in the environment, (3) foster an awareness and appreciation of native cultures, and (4) instill an ethic for the conservation of our cultural heritage.

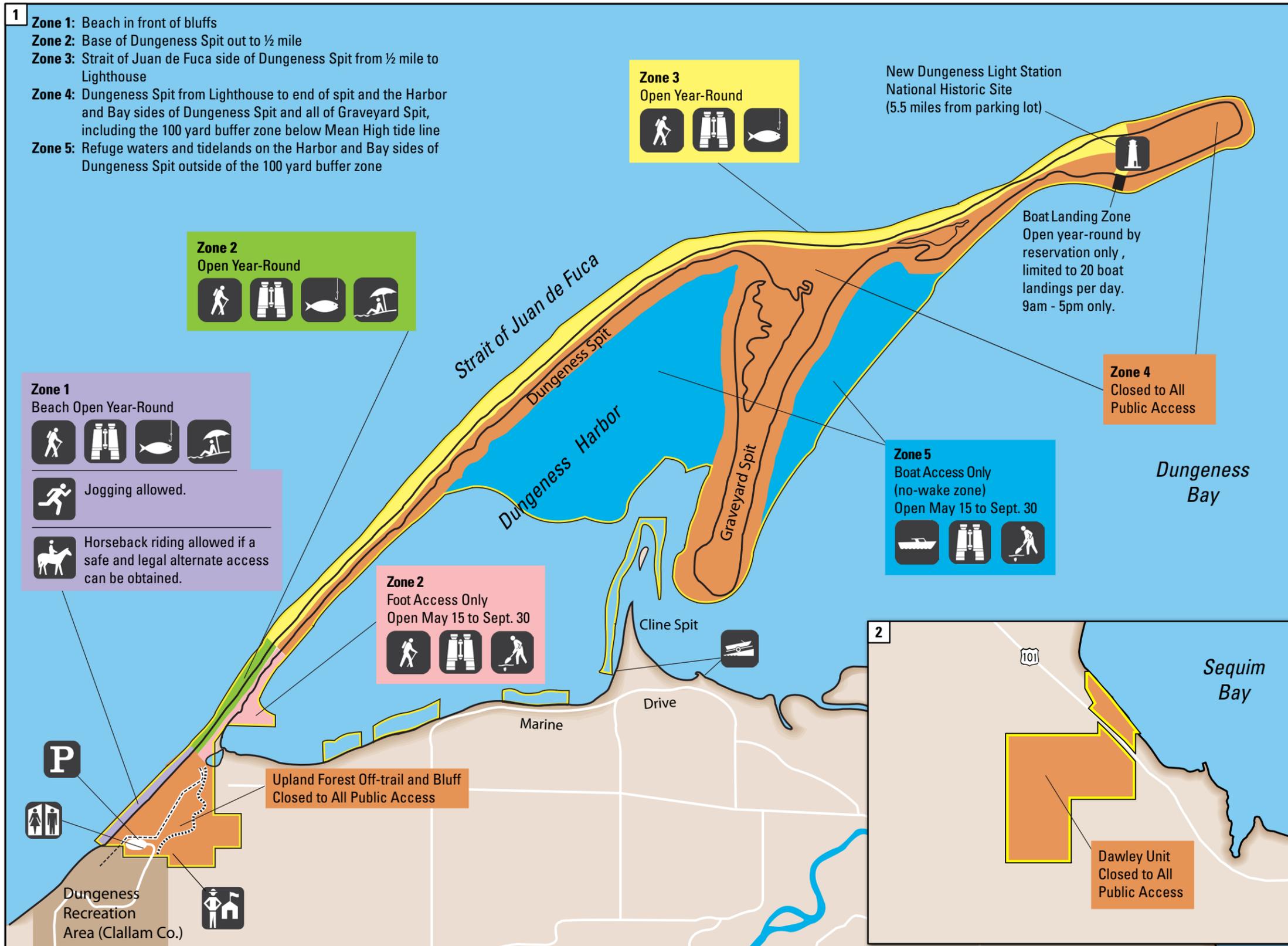
Objective 8.3 Develop and implement a Memorandum of Understanding to formalize NAGPRA activities.
 Create and, throughout the life of the CCP, utilize a Memorandum of Understanding (MOU) with Native American groups to implement the inadvertent discovery clause of the Native American Graves Protection and Repatriation Act (NAGPRA).
Strategies Applied to Achieve Objective
 a. Identify Native American Tribes, Groups, and direct lineal descendants that may be affiliated with the Refuge lands. For example, continue to coordinate with Jamestown S’Klallam and Makah Tribes.
 b. Open consultation process with affiliated Tribes, Groups, and direct lineal descendants.
 c. Define funerary objects, sacred objects and objects of cultural patrimony.
 d. Develop procedures to follow for intentional and inadvertent discoveries.
 e. Identify persons to contact for the purposes of NAGPRA.
Rationale: Development of an MOU prior to an inadvertent discovery is strongly suggested by the NAGPRA implementing regulations. Such an agreement can greatly facilitate and speed up consultations as required by law after an inadvertent discovery.

Figure 2-1. Dungeness National Wildlife Refuge Wildlife and Habitat Management Direction



Data Sources: Refuge Boundaries from USFWS/R1; Roads and City Area from ESRI, Shoreline from BLM; 2009 NAIP 4-band imagery

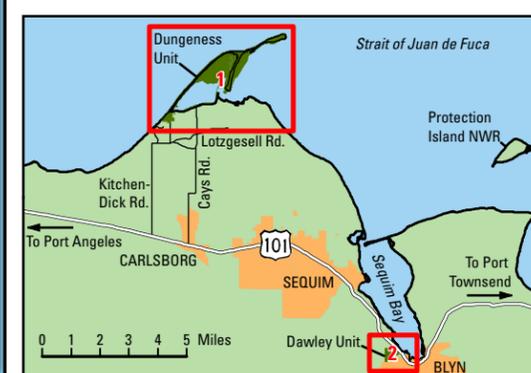
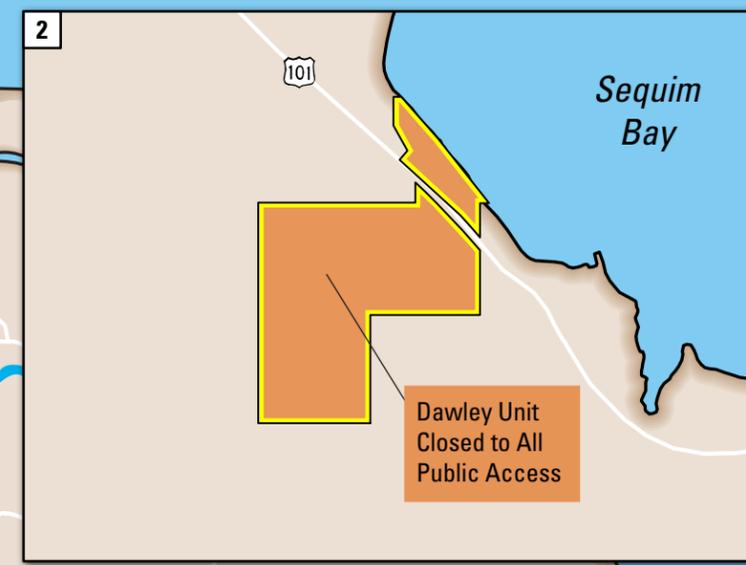
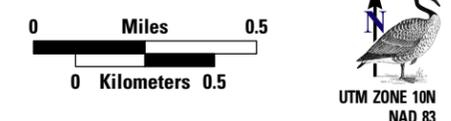
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Legend

- Public Use**
- Hiking
 - Wildlife Observation/Photography
 - Boating (no-wake zone)
 - Beach Use
 - Jogging
 - Clamming, Crabbing
 - Saltwater Fishing
 - Horseback Riding
 - Boat Landing Zone
 - Public Boat Launch
 - Refuge Headquarters
 - Parking
 - Restrooms
 - Hiking Trail
Horseback riding and jogging not allowed.
 - Primitive Trail
Horseback riding and jogging not allowed.

- Refuge Land Status**
- Refuge Managed Lands (Fee Title or Easement)



Data Sources: Refuge Boundaries from USFWS/R1; Roads and City Area from ESRI, Shoreline from BLM

The back sides of maps are blank to improve readability.