

# Protection Island Aquatic Reserve Management Plan

November 2010



# Acknowledgements

## **Washington State Department of Natural Resources**

Peter Goldmark, Commissioner of Public Lands

Bridget Moran, Deputy Supervisory, Aquatic Lands

## **Orca Straits District**

David Roberts, Assistant Division Manager

Brady Scott, District Manager

## **Aquatic Resources Division**

Kristin Swenddal, Aquatic Resources Division Manager

Michal Rechner, Assistant Division Manager, Policy and Planning

Kyle Murphy, Aquatic Reserves Program Manager

Betty Bookheim, Environmental Specialist,

Michael Grilliot, Marc Hershman Marine Policy Fellow, Aquatic Reserves Program Associate

## **GIS and Mapping**

Michael Grilliot, Marc Hershman Marine Policy Fellow, Aquatic Reserves Program Associate

## **Communications**

Abbey Corzine, DNR Communications

## **Principal Authors**

Kyle Murphy, Aquatic Reserves Program Manager

Michael Grilliot, Marc Hershman Marine Policy Fellow, Aquatic Reserves Program Associate

Betty Bookheim, Natural Resource Scientist

## **Aquatic Reserves Technical Advisory Committee, 2009**

Brie Van Cleve, Nearshore and Ocean Policy Analyst, Washington State Department of Fish and Wildlife

Dr. Alison Styring, Professor of Biological Sciences, The Evergreen State College

Dr. Joanna Smith, Marine Ecologist, The Nature Conservancy

John Floberg, Vice President of Stewardship and Conservation Planning, Cascade Land Conservancy

Phil Bloch, Biologist, Washington State Department of Transportation

## **Protection Island Aquatic Reserve Planning Advisory Committee, 2010**

Betty Bookheim, Natural Resource Scientist

Bob Boekelheide, Dungeness River Audubon Center

Darcy McNamara, Jefferson County Beach Watchers

Dave Peeler, People for Puget Sound

David Freed, Clallam County MRC/Beach Watchers

David Gluckman, Admiralty Audubon

Jeromy Sullivan, Port Gamble S'Klallam Tribe

Jill Silver, 10,000 Years Institute

Jim Gift, Olympic Peninsula Audubon Society

John Cambalik, Puget Sound Partnership

John Miller, Clallam County Department of Community Development

John Woolley, Friends of Miller Peninsula State Park

Kelly Toy, Jamestown S'Klallam Tribe

Kevin Ryan, USFWS

Kyle Murphy, Washington State Department of Natural Resources

Lorenz Sollmann, USFWS

Marty Bluewater, Protection Island In-holder

Megan Black, Diamond Point Property Owners

Michael Grilliot, Washington State  
Department of Natural Resources  
Peter Downey, Shellfish Industry  
Robert Elofson, Lower Elwha Klallam  
Tribe

Ross Anderson, Cape George Colony  
Club

Simeon Baldwin, U.S. Coast Guard  
Auxiliary

Soren Prip, Sequim Yacht Club

Tony Petrillo, Jefferson County MRC

Torben Blichfeld, Sequim Yacht Club

Copies of this report may be obtained  
from the Washington State Department  
of Natural Resources Aquatic Reserves  
Program or copied from the web page.

Contact Information

**Aquatic Reserves Program Manager**

Phone: 360-902-1100

E-mail: [aquaticreserve@dnr.wa.gov](mailto:aquaticreserve@dnr.wa.gov)

[www.dnr.wa.gov](http://www.dnr.wa.gov)

DRAFT

# Protection Island Environmental, Scientific, & Educational Aquatic Reserve Management Plan

---



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**  
Peter Goldmark - Commissioner of Public Lands

# Table of Contents

<b>FIGURES</b> .....	<b>IV</b>
<b>ACRONYMS</b> .....	<b>IV</b>
<b>1. EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>2. INTRODUCTION</b> .....	<b>2</b>
I. WASHINGTON’S DEPARTMENT OF NATURAL RESOURCES.....	2
II. AQUATIC RESERVES PROGRAM.....	2
<i>Legal Authorities for Establishing State Aquatic Reserves</i> .....	3
III. PROTECTION ISLAND AQUATIC RESERVE BOUNDARY.....	4
<i>Legal Boundaries</i> .....	4
IV. PURPOSE OF THE PROTECTION ISLAND AQUATIC RESERVE MANAGEMENT PLAN.....	4
<i>Adaptive Management</i> .....	5
V. PROTECTION ISLAND AREA OWNERSHIP.....	6
VI. RELATIONSHIP TO FEDERAL, STATE, LOCAL, AND TRIBAL MANAGEMENT.....	7
<i>Protection Island Aquatic Reserve</i> .....	7
<i>Tribal Interests at Protection Island</i> .....	7
<i>The National Wildlife Refuge System</i> .....	7
<i>Washington State Parks and Recreation Commission</i> .....	9
<i>Navy Region Northwest</i> .....	9
<i>Local Land Use Designations</i> .....	10
<b>3. PROTECTION ISLAND AQUATIC RESERVE</b> .....	<b>12</b>
I. SITE CHARACTERIZATION.....	12
A. <i>Geographic Description</i> .....	12
B. <i>Ecosystem Description</i> .....	12
Physical Processes.....	12
Habitat Characteristics.....	17
Fish and Wildlife Resources.....	18
Conservation Targets.....	22
II. CURRENT CONDITIONS.....	24
III. POTENTIAL FUTURE IMPACTS.....	26
<i>Future Land Use Scenarios</i> .....	26
<i>Commercial and Recreational Shellfish Harvest and Aquaculture</i> .....	27
<i>Water and Sediment Quality and Hydraulic Modifications</i> .....	27
<i>Energy Pipeline or Transmission Line Rights of Ways</i> .....	28
<i>Wind Energy Facilities</i> .....	28
<i>Oil Spill Scenarios</i> .....	28
<i>Naval Activity</i> .....	28
<i>Recreational Use and Mooring Buoys</i> .....	28
<i>Climate Change Scenarios</i> .....	29
IV. ARCHEOLOGICAL, CULTURAL AND HISTORIC RESOURCES.....	29
<b>4. MANAGEMENT GOALS &amp; OBJECTIVES</b> .....	<b>31</b>
DESIRED FUTURE CONDITIONS.....	31
<b>5. MANAGEMENT ACTIONS</b> .....	<b>35</b>
I. RESOURCE PROTECTION, ENHANCEMENT, AND RESTORATION.....	35
A. <i>Protection</i> .....	36
B. <i>Enhancement</i> .....	36
C. <i>Restoration</i> .....	37
II. RESEARCH AND MONITORING.....	38
A. <i>Data Gap Identification and Baseline Inventory</i> .....	39

<i>B. Trend Monitoring</i> .....	39
<i>C. Research</i> .....	40
III. ENVIRONMENTAL EDUCATION .....	41
IV. ALLOWABLE USES .....	41
<i>A. Adjacent Aquatic lands and Uplands</i> .....	41
<i>B. Resource Protection, Enhancement, and Restoration</i> .....	42
<i>C. Research and Monitoring</i> .....	42
<i>D. Environmental Education &amp; Public Access</i> .....	42
<i>E. Commercial and Recreational Fishing</i> .....	42
V. OTHER USES.....	42
<b>6. IMPLEMENTATION GUIDANCE.....</b>	<b>44</b>
I. PROTECTION ISLAND AQUATIC RESERVE IMPLEMENTATION COMMITTEE .....	44
<i>Proposal Evaluation Criteria</i> .....	45
<i>Committee Decisions</i> .....	45
<b>7. GLOSSARY.....</b>	<b>46</b>
<b>8. REFERENCE LITERATURE.....</b>	<b>55</b>
<b>APPENDIX A – OBSERVED SPECIES LISTS .....</b>	<b>59</b>
<b>APPENDIX B – MAPS.....</b>	<b>70</b>
<b>APPENDIX C – LEGAL DESCRIPTION OF PROTECTION ISLAND AQUATIC RESERVE.....</b>	<b>79</b>

## Figures

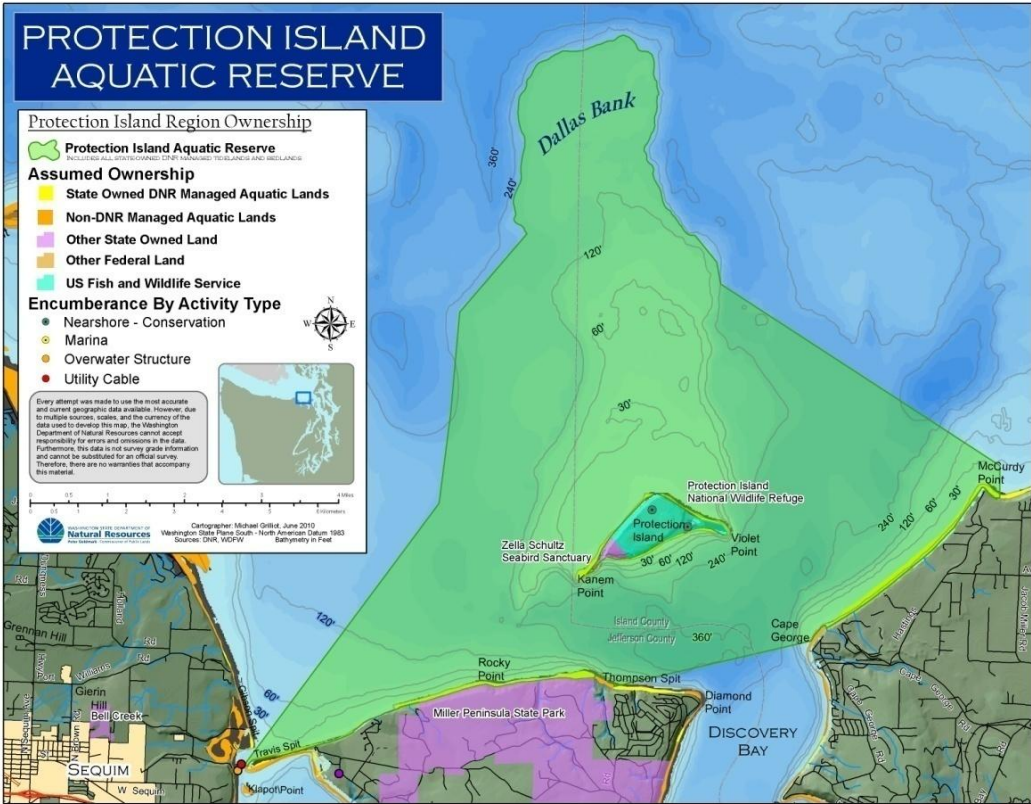
Figure 1 – Protection Island Aquatic Reserve and Vicinity.....	vii
Figure 2 – Washington State Aquatic Reserves.....	3
Figure 3 – Protection Island General Ownership.....	7
Figure 4 – Regional water masses and subareas of Puget Sound: 1) Northern Puget Sound, 2) Whidbey Basin, 3) Main Basin, 4) Hood Canal, and 5) Southern Puget Sound. From Gustafson, et al. (2000).....	16
Figure 5 – Seasonal Patterns of winds over western Washington. From Downing (1983).....	17

---

## Acronyms

<b>DNR</b>	Washington State Department of Natural Resources
<b>MRC</b>	Marine Resources Committee
<b>NHR</b>	National Historic Reserve
<b>NOAA</b>	National Oceanographic and Atmospheric Administration
<b>NPS</b>	National Parks Service
<b>NBK</b>	Naval Base Kitsap
<b>PSAMP</b>	Puget Sound Ambient Monitoring Program
<b>RCW</b>	Revised Code of Washington
<b>SEPA</b>	State Environmental Policy Act
<b>USFWS</b>	United States Fish and Wildlife Service
<b>WAC</b>	Washington Administrative Code
<b>WDFW</b>	Washington State Department of Fish and Wildlife
<b>WSU</b>	Washington State University

Figure 1: Protection Island Aquatic Reserve and Vicinity





---



# 1. Executive Summary

The Protection Island Aquatic Reserve is established as an environmental, scientific, and educational reserve to ensure that DNR's management of state-owned aquatic lands protects the unique habitats and species in the area and promotes sustainable public stewardship of the region. This plan identifies the habitats and species in the reserve and the management actions that will be employed by the Washington State Department of Natural Resources (DNR). The management actions conserve these resources with emphasis on environmental protection above all other management actions.

In general, within its statutory authority, DNR will approve new uses that have been demonstrated to be consistent with the reserve's goals, objectives, and management actions described in chapters 2, 4, and 5 respectively, and support the desired future conditions. There are a number of uses currently authorized within the aquatic reserve that are outlined in Appendix D. This management plan does not apply to private tideland or upland property owners. DNR management authority extends only to the state-owned aquatic lands.

The following management goals have been established for the reserve:

1. Preserve, restore, and enhance the functions and natural processes of the aquatic lands and environment within the reserve.
2. Support opportunities for scientific research by supporting activities that survey and monitor sensitive habitats, species, and natural processes.
3. Support and provide opportunities for outdoor education and interpretive studies.
4. Collaborate with other reserve management partners, programs, and management actions to ensure connectivity across the Aquatic Reserve Program.

The management plan will be reviewed and updated as necessary every ten years throughout the 90-year term of the reserve designation. Changes in ecosystem condition and existing uses of state-owned aquatic lands will be included in the updates. Research and monitoring data will be used to guide DNR and the Implementation Committee in determining whether management actions are meeting the goals and objectives of the reserve. If management actions are not supporting the objectives of the reserve, they will be modified, monitored, and evaluated during the following ten-year review process in accordance with adaptive management strategies.

---



## 2. Introduction

### I. Washington's Department of Natural Resources

DNR manages 2.6 million acres of state-owned aquatic lands, which is all land underlying navigable water that the state has not sold to others. In marine waters, this includes several thousand acres of tidelands following approximately 1,300 miles (2,092 kilometers) of shoreline and almost all bedlands below the line of extreme low tide. DNR also manages several thousand acres of aquatic lands underlying navigable freshwater lakes, rivers, and streams.

Under the Revised Code of Washington (RCW), the Legislature directs DNR to manage state-owned aquatic lands to provide a balance of public benefits that include encouraging public access, fostering water-dependent use, ensuring environmental protection, and utilizing renewable resources. In addition, DNR is directed to generate revenue from state-owned aquatic lands when it is consistent with the other public benefits. Also, DNR may remove the state's sensitive aquatic lands from conflicting uses. Under Washington Administrative Code (WAC) 332-30-151, DNR has adopted a rule for establishing environmental, scientific, and educational aquatic reserves. The Protection Island Aquatic Reserve was confirmed as a reserve candidate in 2008 and established as an environmental, scientific, and environmental aquatic reserve in 2010 to conserve and enhance important habitats and species and promote research and monitoring.

### II. Aquatic Reserves Program

DNR established the Aquatic Reserves Program in an effort to promote preservation, restoration, and enhancement of state-owned aquatic lands that provide benefits to the health of native aquatic habitats and species in Washington. Aquatic Reserves currently cover, including the 2008 proposals, more than 90,600 acres or 140 square miles (363 square kilometers) of state-owned, DNR-managed aquatic lands.

By examining past success in site-based conservation, the Aquatic Reserves Program can help ensure that aquatic reserve status is applied when it is the most appropriate management tool.

Three types of aquatic reserves may be established through the Aquatic Reserves Program: environmental, scientific, or educational. An aquatic reserve may be designated as one or any combination of the three types. The objectives for each reserve category can be found in the *Aquatic Reserve Program Implementation and Designation Guidance*, on DNR's webpage [www.dnr.wa.gov](http://www.dnr.wa.gov).

DNR and its partners will manage each reserve in a manner consistent with the goals for the type of reserve established and site-specific management plans.

**Figure 2: Washington State Aquatic Reserves**



## Legal Authorities for Establishing State Aquatic Reserves

The constitutional authority for proprietary management of state-owned aquatic lands is derived from Articles XV and XVII of the Washington State Constitution. DNR is directed by state legislature in RCW 79.100 through 79.145 to manage the state-owned aquatic lands to provide a balance of public benefits that include encouraging public access, fostering water-dependent use, ensuring environmental protection, and utilizing renewable resources. In addition, DNR is directed to generate revenue from state-owned aquatic lands when consistent with the other legislatively directed public benefits.

---

RCW 79.105.030 identifies environmental protection, the overarching goal of the Aquatic Reserves Program, as one of the DNR's primary directives for the management of state-owned aquatic lands. RCW 79.10.210 authorizes DNR to identify and withdraw public lands from all conflicting uses. RCW 79.105.210(c) further authorizes DNR to withhold from leasing lands that DNR finds to have significant natural values. Under this statute, DNR also may protect significant natural values by including special terms and conditions in a lease. Under WAC 332-30-151, DNR considers lands with educational, scientific, and environmental values for aquatic reserve status, and identifies management guidelines for aquatic reserves. WAC 332-30-106(16) defines environmental reserves as sites of environmental importance, which are established for the continuance of environmental baseline monitoring and/or areas of historical, geological, or biological interest requiring special protective management. WAC 332-30-106(64) defines scientific reserves as sites important for scientific research projects and/or areas of unusually rich plant and animal communities suitable for continuing scientific observation.

### **III. Protection Island Aquatic Reserve Boundary**

The Protection Island Aquatic Reserve encompasses approximately 23,778 acres of state-owned DNR managed tidelands and bedlands. The southern reserve boundary includes those state-owned aquatic lands along the northern coast of Miller Peninsula and the northwest coast of the Quimper Peninsula from Cape George to just east of McCurdy Point. The reserve boundary extends seaward to include all state-owned aquatic lands, northeast from Travis Spit on the Miller Peninsula, to the 200 foot bathymetry contour. The boundary follows the 200 foot bathymetry line around to the east side of Dallas Bank then extends southeast to the eastern edge, just east of McCurdy Point. The southern boundary includes all state-owned aquatic lands between Miller Peninsula and the Quimper Peninsula from Thompson Spit and Cape George. Section 3 of this document provides a more thorough geographic, physical, and biological description of the Protection Island Aquatic Reserve.

#### **Legal Boundaries**

For a complete legal description of the Protection Island Aquatic Reserve boundaries please refer to Appendix C.

### **IV. Purpose of the Protection Island Aquatic Reserve Management Plan**

This plan describes the habitats and species identified for conservation in the aquatic reserve and the actions that will be implemented to protect these resources. The plan also describes research goals for the aquatic reserve and identifies future research needs. The management emphasis will place protection of these resources and potential research needs above other management actions.

---

The Protection Island Aquatic Reserve Management Plan has been developed in accordance with the State Environmental Policy Act (SEPA). This plan will serve as DNR's primary management guidance for the 90-year term of the reserve. At least every ten years after the adoption of the plan, it will be reviewed and, if necessary, updated with current scientific, management, and site-specific information. During the development of each subsequent update, DNR will work with other jurisdictions, tribes, interest groups, adjacent landowners, and local citizens to establish cooperative management for activities within and adjacent to the reserve—activities that promote conservation, research, enhancement and restoration of habitats and species within the reserve.

Decision making and planning regarding management of the aquatic reserve will be guided primarily by the following three sections of this plan, generally described here:

1. **Protection Island Environmental, Scientific, and Educational Aquatic Reserve:** This serves as an introduction to the site. Resource characteristics are identified and current ecological conditions are described for the site. Habitat and species conservation targets are identified and future impacts and data gaps are also identified in this section.
2. **Management Goals and Objectives:** This section identifies the desired future ecological conditions and research targets. Goals and objectives are also identified that will aid in site management decision making.
3. **Management Actions:** This section describes various management actions to be taken that will allow the desired future ecological conditions and research goals to be achieved. Opportunities for protection, enhancement, restoration, research, and education will be identified. Monitoring of ecological conditions will be discussed and prohibited and allowable uses of the site will be established.

## **Adaptive Management**

'Adaptive management' is a systematic process for continually improving site management by learning from the results of past management actions. To ensure that the future conditions of the aquatic reserve site are met and adaptive management is being implemented, the management plan will be reviewed and updated every 10 years throughout the 90-year term of the reserve designation. Adaptive management will help DNR integrate changes in scientific knowledge concerning the site, conditions of habitats and species, and existing uses of state-owned aquatic lands. Knowledge gained from research and monitoring activities also will be used to guide DNR in determining if management actions are meeting the goals and objectives of the reserve. If management actions are not successfully contributing to the goals and objectives for the reserve, then they will be modified, monitored, and evaluated during the following 10-year review process. DNR will include new scientific findings in management plans, and new inclusions and adaptations will not be restricted to every 10 years.



## V. Protection Island Area Ownership

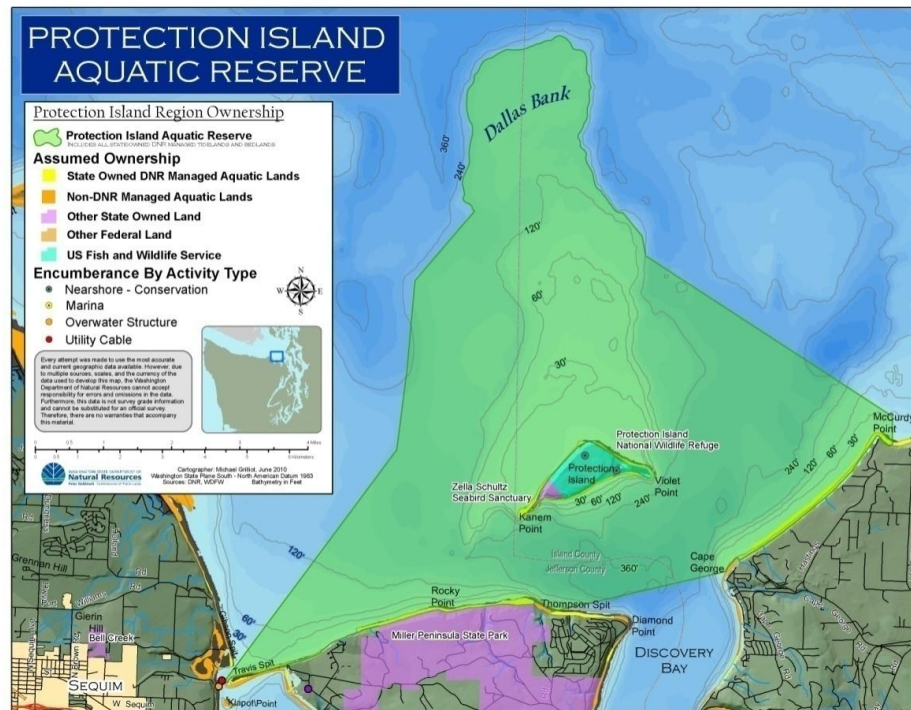
All lands within the aquatic reserve are owned by the state and managed by DNR, however, uses on adjacent public and private lands will affect the species and habitats found within the aquatic reserves. This section identifies the various layers of ownership that exist adjacent to the aquatic reserve.

Washington State Parks manages Miller Peninsula State Park adjacent to the reserve. Numerous private upland parcels exist adjacent to the reserve on Miller Peninsula and Quimper Peninsula. The adjacent upland property on Quimper Peninsula is entirely privately owned. DNR will attempt to work cooperatively with these property owners to ensure proper protection for the aquatic reserve.

Two private tideland parcels exist adjacent to the reserve, one on the northern shoreline of Miller Peninsula and one on the Quimper Peninsula. The rest of the tidelands are owned by the State of Washington and managed by DNR.

Protection Island is owned and operated by the U.S. Fish and Wildlife Service (USFWS) as part of the National Wildlife Refuge System. The western portion of the Island is managed by Washington State Department of Fish and Wildlife (WDFW) as the Zella M. Schultz Seabird Sanctuary. Protection Island has a 200 yard mandatory exclusion buffer around it at all times to protect the wildlife nesting and rearing habitat.

**Figure 3: Protection Island Area General Ownership**



---

## **VI. Relationship to Federal, State, Local, and Tribal Management**

The successful management of the Protection Island Aquatic Reserve will require coordination and collaboration with public and private entities as well as local, state, federal, and tribal governments, and non-government organizations. The following provides information regarding ongoing management interests at or near the Protection Island Aquatic Reserve.

### **Smith and Minor Islands Aquatic Reserve**

DNR has developed, in coordination with local, state, federal, and tribal governments, and non-government organizations, a management plan for the Smith and Minor Island Aquatic Reserve. The reserve is located about eight miles northeast of the Protection Island Aquatic Reserve and includes the western shoreline of Whidbey Island from just south of Partridge Point to Joseph Whidbey State Park, and extending west to a depth of 200 feet. The reserve also includes the state-owned aquatic lands surrounding Smith and Minor Islands. The site contains a diverse assemblage of habitats and species including; seagrass and kelp beds, rocky shorelines, sea urchins, scallops, sea cucumbers, crabs, reef dwelling and demersal ground fish, salmon and forage fish.

The designation of an aquatic reserve surrounding Smith and Minor Island, in close proximity to the Protection Island Aquatic Reserve, provides some level of habitat connectivity for several species that inhabit both locations, particularly foraging seabirds, marine mammals, and perhaps salmonids. Future research could be conducted to study this possible relationship.

### **Tribal Interests at Protection Island**

The following Tribes have either established or asserted a claim to usual and accustomed treaty fishing areas in the Protection Islands region:

- Jamestown S’Klallam
- Lower Elwha Klallam
- Port Gamble S’Klallam

Conservation goals and management activities identified in this management plan are not intended to impair any reserved tribal treaty rights or be in conflict with tribal natural resource, or cultural interests. DNR will continue to engage in a government-to-government dialog with the tribes to ensure that treaty rights are upheld, and that historical and cultural ties to the Protection Island region are maintained.

### **The National Wildlife Refuge System**

The National Wildlife Refuge System is a federal program housed within the U.S. Department of the Interior, USFWS. The system was established by President Theodore Roosevelt in 1903. The Refuge System is charged with maintaining the

---

biological integrity, diversity and environmental health of the natural resources under protection for the benefit of present and future generations of Americans.

Protection Island National Wildlife Refuge is located near the mouth of Discovery Bay in the Strait of Juan de Fuca in Jefferson County, Washington. Protection Island is currently managed by the USFWS, in cooperation with WDFW, who is responsible for managing the Zella M. Schultz Seabird Sanctuary. DNR has withdrawn the area within 200 yards (182.8 meters) of the island from the general leasing program, resulting in a 343-acre marine buffer area that is managed by the USFWS. About 1,000 harbor seals depend upon the island for a pupping and rest area at various times throughout the year. Approximately 70 percent of the nesting seabird population of Puget Sound and the Strait of Juan de Fuca nest on Protection Island; this includes the third largest nesting colonies of Rhinoceros Auklets in North America, one of the largest nesting colonies of Glaucous-winged Gulls and Pigeon Guillemots in the inner marine waters of Washington, and one of the last two nesting colonies of Tufted Puffins in Puget Sound. In addition, Elephant seals are re-colonizing areas of the Pacific Northwest and regularly use Protection Island for pupping and molting (US Fish and Wildlife Service 2010). Like many of the islands in the Washington Maritime National Wildlife Refuge Complex, Protection Island is closed to the public, yet still provides wildlife observation, photography, site-seeing, and research opportunities. A 200 yard (182.8 m) buffer around the island is closed to the public year-round.

The San Juan Islands National Wildlife Refuge which includes Smith and Minor Islands, about 14 miles north-northwest, consists of 83 rocks, reefs, grassy islands, and forested islands totaling almost 450 acres scattered throughout the San Juan Islands region of northern Puget Sound. The San Juan Islands National Wildlife Refuge was set aside to protect colonies of nesting seabirds, including Pigeon Guillemots, Double-crested Cormorants, and Pelagic Cormorants, along with recognized seal haul-outs. In order to help maintain the natural character of these islands, all the refuge islands except Matia and Turn Islands are closed to the public. All refuge islands in the San Juan National Wildlife Refuge are designated wilderness with the exception of Smith, Minor, and Turn Islands and the five acre designated camping area on Matia Island. Smith and Minor Islands provide wildlife observation and photography as well as potential research opportunities.

The Dungeness National Wildlife Refuge is composed of 631 acres, situated north of Sequim, Washington and about nine miles west of Protection Island National Wildlife Refuge, and includes Dungeness Spit, Graveyard Spit, portions of Dungeness Bay and Dungeness Harbor. While many species of waterfowl winter in the Dungeness area, A number of species of shorebirds and waterfowl stop briefly in the area each fall on their way south for the winter and again when they head north in the spring. Dungeness Bay and Harbor support large populations of Black Brant, present from late October through early May, with peak numbers of approximately 3,000 in April. Up to 10,000 Sanderling and Dunlin can be seen on the spit or within the bay throughout the winter. During breeding season, Caspian Tern, Glaucous-winged Gull, Black Oystercatcher and many other aquatic bird species nest in the refuge. During certain times of the year, recreational activities such as fishing, swimming and other beach activities are allowed only in selected areas along the outer side of the spit.



---

This provides ample space and opportunity for wildlife to rest and feed. A lighthouse, built in 1857, is located near the end of the spit.

## **Washington State Parks and Recreation Commission**

The Washington State Parks and Recreation Commission's mission is to "acquire, operate, enhance and protect a diverse system of recreational, cultural, historical and natural sites. The Commission fosters outdoor recreation and education statewide to provide enjoyment and enrichment for all and a valued legacy to future generations." The Washington State Park System includes over 120 developed parks including 20 marine parks.

Three State Parks are adjacent to or near the Protection Island Aquatic Reserve, Miller Peninsula State Park, Sequim Bay State Park, and Fort Worden State Park. Miller Peninsula State Park is a development project currently under consideration for Washington's next state park but is contingent on state funding. Sequim Bay State Park is a 92-acre marine camping park with 4,909 feet of saltwater coast in the Olympic range rain shadow that provides opportunities for various activities including hiking, boating, swimming, clamming, crabbing, athletic fields, beachcombing, bird watching, interpretive activities, and horseshoes. Fort Worden State Park is located north of Port Townsend on the northeast end of the Quimper Peninsula. Fort Worden State Park is a 434-acre multi-use park with more than two miles of saltwater shoreline. The park rests on a high bluff overlooking Admiralty Inlet. The State Parks adjacent to and near the Protection Island Aquatic Reserve provide seabird nesting and rearing habitat, ecologically preserved coastal-upland ecosystem connectivity, and environmental education opportunities.

## **Navy Region Northwest**

Navy Region Northwest is the Navy's third largest fleet concentration area. Command Navy Region Northwest includes the installations, Naval Air Station Whidbey Island, Naval Station Everett, Naval Base Kitsap (NBK) Bremerton, Naval Base Kitsap (NBK) Bangor, and Naval Magazine Indian Island. The region is home to approximately 31,000 active duty members, 16,000 civilian employees, 6,000 drilling reservists, and 42,000 family members. Naval maneuvers are conducted in the Protection Island Aquatic Reserve and the surrounding region from any one of the naval installations.

Naval Air Station, Whidbey Island was commissioned as an active U.S. Navy installation on 21 September 1942. Naval Air Station, Whidbey Island is composed of two bases, the Seaplane Base, near the edge of the city of Oak Harbor, and Ault Field, northwest of the Seaplane Base. Naval Station Everett is the Navy's most modern facility and home to two destroyers, three frigates, one aircraft carrier, and two Coast Guard cutters. Naval Base Kitsap is the largest naval organization in Navy Region Northwest, and it is composed of installations at Bremerton, Bangor, and Keyport, Washington. Naval Base Kitsap provides support for 15 submarines and surface ships including an aircraft carrier and eight SSBN trident submarines. Naval Magazine Indian Island comprises the entirety of the 2,716-acre Indian Island located on the northeast corner of Washington State's Olympic Peninsula and provides ordnance logistics support to the Pacific Fleet and the joint services in peace and war.

---

## Local Land Use Designations

Development of parcels adjacent to the reserve are limited to a density which exemplifies the designation and policy of the shoreline designation within which they are located. Both Clallam County and Jefferson County have Shoreline Master Programs that specifically describe land management in each county. Potential impacts to the reserve from local land use designations are discussed in section 3 of this plan. DNR will work with the local governments and tribes to address those impacts through shoreline master plan development and other mechanisms.

### Clallam County

The Clallam County Shoreline Master Program classifies the shoreline of and adjacent to the reserve as one of five shoreline environments. The reserve site is near Sequim's urban growth area just across from Kiapot Point.

Section 5.08 C-4 of the Clallam County Shoreline Master Program requires shore setbacks for single family constructions to be a minimum of 35, 35, 50, 75, and 150 ft (10.5, 10.5, 15, 23, 46 m) for Urban, Suburban, Rural, Conservancy, and Natural shoreline environments respectively. Multi-family units have increased minimum setbacks of 50, 75, 100, 200, and 200 ft (15, 23, 30, 61, 61 m) respectively. Uplands adjacent to the reserve fall into two of the shoreline environment classifications: Rural and Conservancy. The Rural classification protects agricultural shorelines from urban expansion and restricts intensive development along shorelines presently in an undeveloped state. The Conservancy classification seeks to accommodate uses which are non-consumptive of the physical and biological resources of the area, and activities and uses of a non-permanent nature which do not substantially degrade the existing character of the areas (Clallam County Shoreline Advisory Committee 1992). There are two residential developments in Clallam County that are near the reserve, Diamond Point and a much smaller community near Kiapot Point. There are two boat ramps near the reserve on state-owned aquatic land as well.

The northern shoreline of Miller Peninsula is split between a Rural and Conservancy shoreline designation. The Rural designation surrounds Diamond Point and the shoreline of section 13 and 24 T30N R03W. The Conservancy designation covers the shoreline of section 23 and 22 on Kaipot Point and the shoreline bordering Miller Peninsula State Park.

### Jefferson County

The Jefferson County Shoreline Master Program classifies the shoreline of and adjacent to the reserve as one of six developmental designations. The reserve site is not adjacent to any future urban growth areas in Jefferson County as designated by the Shoreline Master Program.

Article VI of the Jefferson County Shoreline Master Program requires a 150 foot buffer plus a 10 foot building setback from marine shorelines. At least 80 percent of the required shoreline buffer area shall be maintained in a well-vegetated and predominantly natural condition to ensure that it provides the desired ecological

---

buffer functions. Uplands adjacent to the site fall into two of the developmental designations: natural and shoreline residential. The natural designation protects from harm or adverse impact shoreline areas that are intact, have minimally degraded functions and processes, or are relatively free of human influence. The shoreline residential designation accommodates residential development and accessory structures that are properly located and designed, in areas where high density residential developments and services exist or are planned (Jefferson County Department of Community Development 2009). The Cape George residential development is the only development in Jefferson County that is near the reserve.

The majority of the reserve is designated as aquatic environment. Aquatic environments, relative to the aquatic reserve, include all marine areas seaward of the ordinary high water mark, and are subject to the environmental management policies of the Jefferson County Shoreline Master Program. Some of the management policies of this designation are consistent with the state aquatic reserve designation and may provide another level of protection. The majority of shoreline is natural with only a short, less than 3000 ft (805 m) section classified as residential development.



---

## 3. Protection Island Aquatic Reserve

### I. Site Characterization

The Protection Island Aquatic Reserve (Figure 1, pg. v) contains diverse physical habitats that include; sand flats and beaches, sand and gravel flats and beaches, gravel flats, and extensive intertidal and subtidal vegetation. These habitats are recognized as essential contributors to the reproductive, foraging, and rearing success of many fish and bird species. A primary goal for creating the Protection Island Aquatic Reserve is the preservation of the vegetation and habitat the region provides for numerous species that use the waters. Potential restoration of *Nereocystis* (bull) kelp habitat is also a high priority due to losses around Protection Island. The reason for the loss of bull kelp is unknown. The area is in close proximity to the largest bull kelp field in Washington near Smith and minor Islands. (Nightingale 2000).

The following section provides an overview of the environmental and natural resource characteristics for the Protection Island Aquatic Reserve and the adjacent areas. Physical and biological characteristics within or adjacent to the reserve, including physical processes, habitat, species, water and sediment quality are summarized in the following section. Understanding the processes and functions in the Protection Island region will help guide decisions regarding aquatic land management that influences the reserve and its associated ecological relationships.

#### A. Geographic Description

The Protection Island Aquatic Reserve is located on state-owned aquatic land within Jefferson County and Clallam Counties in the eastern Strait of Juan de Fuca, just north of the Miller and Quimper Peninsulas. The Eastern boundary includes state-owned, DNR-managed tidelands adjacent to Quimper Peninsula to just east of McCurdy Point, locally known as Middle Point. The reserve boundaries extend seaward from Miller and Quimper Peninsulas to include Protection Island, as well as, Dallas Bank out to the 200 foot (61 m) bathymetric contour (Figure 1, pg. vii). The total acreage of the reserve is 23,778 acres.

#### B. Ecosystem Description

##### Physical Processes

The Protection Island region experiences a mid-latitude marine west coast or modified-Mediterranean climate, characterized by cool, wet winters and warm, dry summers (Downing 1983). The Pacific Ocean acts as a temperature moderator while changing pressure systems determine the overall wind direction. Temperatures rarely reach 90 F (mid-30 C) or lower into the teens in the region. Additionally, the

---

Olympic Mountains act as a barrier to air masses traveling through the region leaving the area in its rain shadow. As a result, the town of Sequim just west of the reserve, receives about 16 inches (40.6 cm) of rain per year (The Weather Channel Interactive, Inc. 2010).

Repeated glaciations, the last retreating about 12,000 years ago, have shaped Protection Island and the surrounding region into a complex environment that promotes vital oceanographic processes. Protection Island is a glacial till island that was formed by the deposition of glacially eroded sediment over thousands of years. Similarly, the areas bathymetry was formed by glacial scouring and subglacial meltwater erosion (Booth 1994). Glacial and meltwater scouring has left Puget Sound with a number of basins connected by sills and ridges constricting water flow from one basin to the next (Figure 4).

Protection Island experiences a semi-diurnal tidal cycle, with a mean range of 5.35 feet (1.63 m) according to the nearest tidal station at Port Townsend (Davies 1964, National Oceanic and Atmospheric Administration 2005). The project area is also highly exposed to the prevailing winds of the region. As a result, winds travelling over the Strait of Juan de Fuca have an average wind direction and wind speed of 199 degrees (SSW) and 9.4 knots (National Data Buoy Center 2009). Greatest wave heights in the reserve area occur when winter storm winds combine with the large fetch distance provided by the Strait of Juan de Fuca (Figure 5). The tidal and wind patterns of the eastern strait are significant influences on circulation patterns of the region.

General circulation in the strait is characterized as a normal mean circulation pattern in a fjordal estuary with seaward surface flow of diluted seawater in the upper layer and an inshore flow of saline oceanic water at depth (Collias 1974, Thomson 1994, Gustafson, et al. 2000). Concentrations of nutrients are consistently high throughout most of Puget Sound largely due to the flux of oceanic water entering the basin (Harrison, et al. 1994, Gustafson, et al. 2000). The complex bathymetry in Admiralty Inlet, which interrupts natural oceanic inflow from the Pacific Ocean through the Strait of Juan de Fuca, and freshwater outflow from Puget Sound, forces nutrient rich waters to the surface where they nourish the phytoplankton based food web. During summer up-welling conditions, this source-water originates from the slope region, where it is both high in nutrients and low in oxygen. Once into the Strait, the source water flows along the bottom, mixing slightly with mid-depth waters, and eventually encountering the island channels and sills south and east of Victoria (VENUS, 2004).

There are three second-order streams that flow into the Protection Island reserve and no major freshwater sources flowing into the reserve. The lack of freshwater influence combined with minimal amount of rainfall produces very little freshwater influence on the reserve area with exception of storm events. Strong seasonal storms, mainly during the winter and spring, may contribute both freshwater and sediment to the Strait and can form large lenses of low salinity and high turbidity water within the nearshore zone (ESA Adolfson 2008).

Moderate tidal currents and a wind-wave dominated regime in the waters of the eastern portion of the Strait of Juan de Fuca drive the littoral drift processes on

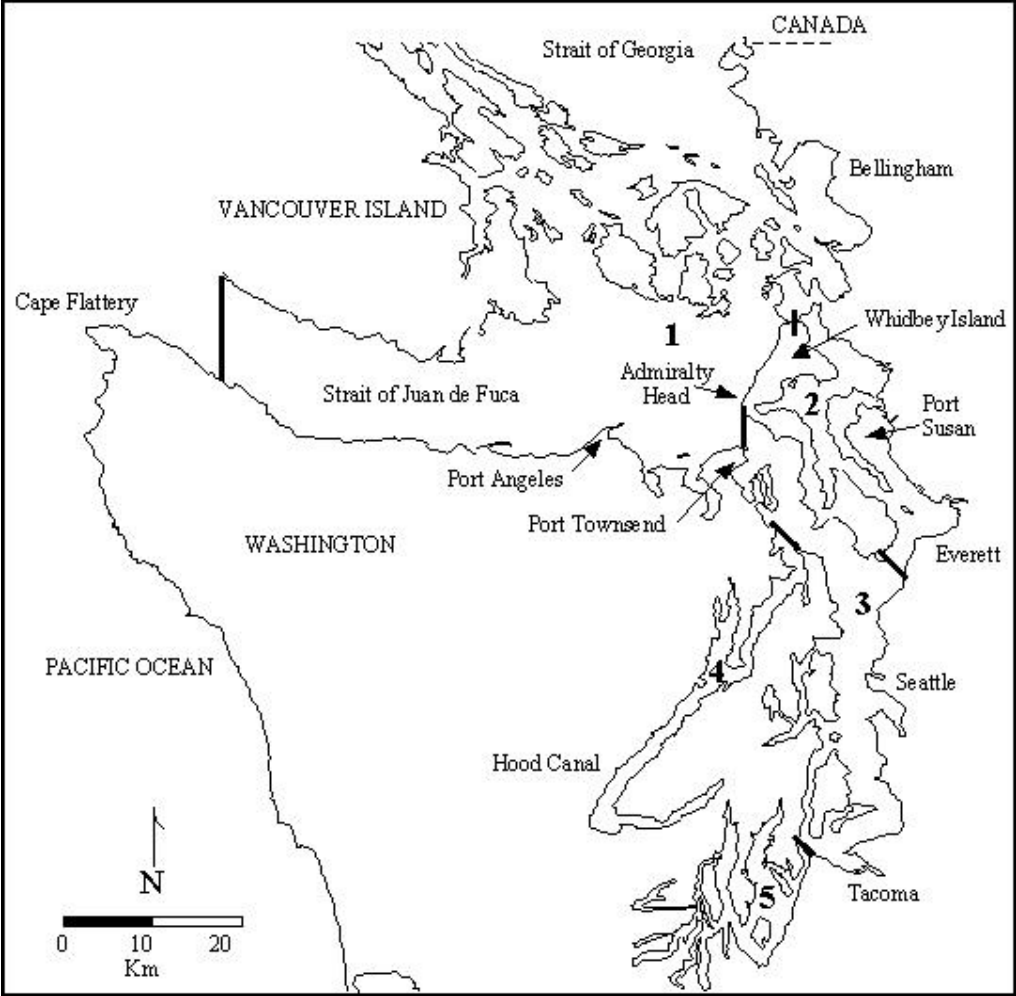
---

Protection Island and the northern shores of Miller and Quimper Peninsula. Wind waves in the Strait of Juan de Fuca typically approach the shore at an angle producing littoral drift, and its net effect, net-shore drift. Each net-shore drift cell represents sediment transport from a source (erosional environment) to a sink (depositional environment) where wave energy is no longer enough to entrain the sediment. Properly functioning drift cells are essential for creating and maintaining nearshore habitat for forage fish, shellfish, and other species. Therefore, it is convenient for shoreline planners to divide the shoreline into drift sections for characterization and management purposes (ESA Adolfson 2008).

Nearshore littoral drift within and adjacent to the reserve appear intact with no areas of human modification such as shoreline armoring (Appendix B, Figure 10). Drift cell JEF-23 and JEF-24 on the Quimper Peninsula originate at a zone of divergence between McCurdy Point and Cape George (Appendix B, Figure 2) (Jefferson County Department of Community Development 2008). Net shore drift is east around McCurdy Point and west around Cape George. The reserve boundary was extended to include this dynamic drift system. Four additional drift cells are identified on Miller Peninsula, designated JF-18-1 through JF-18-4 (Appendix B, Figures 2 & 12). JF-18-1 and JF-18-2 diverge at Rocky Point; JF-18-1 drifts west to supply Kiapot Point while JF-18-2 drifts east to supply Thompson Spit. JF-18-3 and JF-18-4 diverge in between Thompson Spit and Diamond Point; JF-18-3 drifts west supplying Thompson spit while JF-18-4 drifts east supplying Diamond Point. One drift cell is identified on Protection Island beginning at the northern most point of the island and heading southeast, supplying Violet Spit (Washington State Department of Ecology 1991).

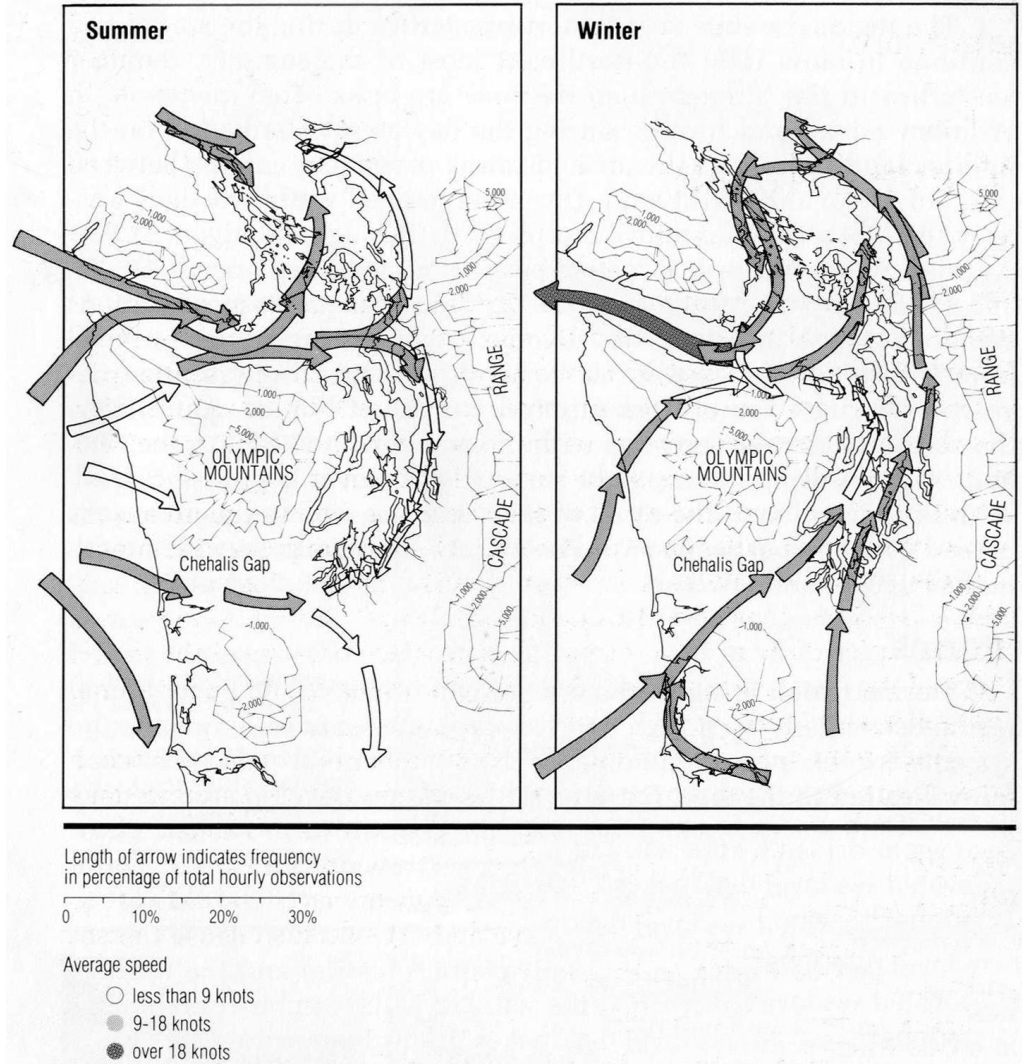
The majority of the project area is adjacent to dramatic high vegetated bluffs; the beaches below appear to be well-nourished and sustained by unimpeded nearshore processes. The beaches characteristically have two foreshore components, the high-tide beach and low-tide terrace (Downing 1983, Johannessen 1993). The high-tide beach consists of a steep beach face with coarser material, while poorly sorted finer sediment is deposited seaward of the high-tide beach in a gently sloping environment (Chu 1985, Komar 1998, Johannessen and MacLennan 2007). Lag deposits, ranging from cobbles to boulders derived from bluff recession, are also found in the low-tide terrace (ESA Adolfson 2008).

**Figure 4 – Regional water masses and subareas of Puget Sound: 1) Northern Puget Sound, 2) Whidbey Basin, 3) Main Basin, 4) Hood Canal, and 5) Southern Puget Sound. From Gustafson, et al. (2000).**





**Figure 5 – Seasonal Patterns of winds over western Washington. From Downina (1983).**





---

## Habitat Characteristics

The habitat characteristics and associated communities in the reserve area are influenced by the interaction of oceanic waters with shorelines, intertidal areas, and benthic substratum substantially exposed to wind waves and strong currents. This dynamic physical regime and associated processes, along with a minimal amount of human intervention, supports a high level of biodiversity and species richness and provides the sustenance for productive habitat areas. The Nature Conservancy Puget Trough/Georgia Basin Ecoregional Plan, (2002) identified Protection Island and 5,956 acres of marine habitat surrounding the island as a high priority biological diversity area. The proposed reserve boundary, which captures approximately 23,778 acres, includes this area.

A rich and complex community of submerged vegetation persists along the shores of Miller and Quimper Peninsulas and in areas around Protection Island. The extensive aquatic vegetation, eelgrass (*Zostera marina*) and seagrass (*Phyllospadix* spp.) beds, and voluminous macroalgal beds are recognized as essential contributors to the reproductive, foraging, and rearing success of many bird and marine mammal species that frequent the region (WDNR Nearshore Habitat Program 2001). Eelgrass and surfgrass extend along the northern shoreline of the Quimper Peninsula, sometimes in mixed beds or adjacent to one another (Appendix B, Figure 9). Surfgrass beds also occur in pockets on the south side of Protection Island while eelgrass is noted in subtidal videography in patches around the islands. Large brown leafy seaweed, including kelps, mix with prolific red, brown, and green macroalgae forming extensive beds in lower intertidal and shallow subtidal areas. Gaps with finer unconsolidated substrate provide a foothold for patches of seagrass to emerge amongst the profusion of macroalgae.

Kelp beds off the northern shore of Protection Island declined drastically between 1989 and 1997, however the cause of the decline is unknown (Sewell 1999, Gustafson, et al. 2000, Nightingale 2000). The site's historical loss of floating kelp around Protection Island is of particular interest and an apparent large distribution throughout the Smith and Minor region suggests a paired site study between the two proposed reserves could unlock some of the mysteries of kelp distribution and conditions needed for survival (see Appendix B, Figure 3 for kelp distribution from 1989-2008)

A range of diverse substrates, including sandy tidal flats, sand beaches, sand and gravel beaches, and high energy gravel and cobble beaches also contribute to high quality essential habitat for numerous species of fish, invertebrates, resident and migratory birds, and marine mammals. In addition, the unique and remote habitat on Protection Island includes two protected sandy peninsulas that support seals and sea-lions that use the surrounding waters as feeding grounds. Coarse gravel and sand dominant beaches are prevalent along the exposed shoreline of Miller and Quimper Peninsula with scattered boulders promoting stable settling habitat for more sessile fauna and flora. At the end of the drift sector along Thompson Spit in upper intertidal areas, a band of coarse sand substrate provides the essential habitat for spawning Pacific sand lance.

---

## **Fish and Wildlife Resources**

As discussed in the preceding section, much of the aquatic lands within the reserve and the associated waters, support spawning, rearing, and foraging habitat for numerous fish, migratory and resident birds and marine mammals and marine invertebrate species. Extensive aquatic vegetation, diverse substrates, and unperturbed physical and ecological processes within the upland-marine interface provide for productive habitat areas.

This area was also the subject of a number of biological baseline studies completed in the 1970s to provide a historic baseline for birds, fish, benthic, and invertebrate populations. These studies were completed as part of the National Oceanic and Atmospheric Administration's Marine Ecosystem Analysis (MESA), Puget Sound Project, when the eastern Strait of Juan de Fuca came under consideration as a possible oil transshipment terminal site.

### **Fish**

The mainland nearshore provides a cool, shallow micro-climate for migration and food production (insects) for juvenile salmon. Forage fish and juvenile salmon are major prey sources for seabirds, rockfish, and marine mammals. Recent observations of migrating juvenile salmon summarized in the regional nearshore chapter of the Chinook Recovery Plan (PSAT, 2005) and the Hood Canal Summer chum Recovery Plan (Hood Canal Coordinating Council, 2006) suggest this area is critical for migration support for Elwha River Chinook and Hood Canal summer chum salmon populations.

Large mixed sand and gravel tidal flats in this area contain productive microalgae and macroalgae providing important habitat for juvenile fish species, for example salmonids and their prey resources (i.e. harpacticoids, copepods, and amphipods). As part of the Eastern Straits Fish Use Assessment, juvenile salmon were found to use shore zone areas within the reserve from February through August. In 2005 and 2006, juvenile chum and pinks were the most abundant salmonids documented from beach seining surveys. Also, wild juvenile chinooks were documented in the area from May through August, with peak catches in both years in July. Abundances of wild and hatchery chinook were similar in 2005, while there were fewer hatchery chinook in 2006.

The proposed reserve boundary captures much of the Discovery Bay Pacific Herring pre-spawn holding areas (WDFW) located around Protection Island. These pre-spawn holding areas are critical habitat for Pacific Herring, which is the predominant stock in the Strait of Juan de Fuca. However, from the mid 1980s to the present, stock estimates from this region have shown a continuing decline (WDFW). The reason for the decrease in abundance is unknown. Commercial landings from the area during 1977-96 have been insignificant and no known major environmental changes in the area have occurred.

The diverse submerged aquatic vegetation beds in the proposed reserve are important habitat for juvenile rockfish, a WDNR priority species. The demersal habitats surrounding the islands and banks also support lingcod, rockfish, halibut, kelp

---

greenling, cabezone, salmon, and large cetaceans (Palsson 2000). Marine flatfish such as starry flounder (*Platichthys stellatus*), rock sole (*Pleuronectes bilineatus*), and sand sole (*Psettichthys melanostictus*) typically use shallow flats closer to shore, however english sole (*Pleuronectes vetulus*) also are present, and most of these species may remain nearshore even as adults.

Surf smelt (*Hypomesus pretiosus*) and Pacific sand lance (*Ammodytes hexapterus*) use a band of fine pebble to coarse sand substrate in the upper intertidal zone to lay their eggs. Although this substrate is suitable for surf smelt spawning the Nearshore Inventory has currently detected no evidence of spawning. Pacific sand lance has been documented to spawn on short sections of the Miller Peninsula shoreline adjacent to or in the reserve. Surf smelt and Pacific sand lance constitute a major portion of the diets of salmon, seabirds, marine mammals, and other fish, as do many of the fish caught in the beach seining project carried-out by the Island County Beach Watchers and the Wild Fish Conservancy. A comprehensive list of fishes observed within the reserve's boundary can be found in Appendix A.

## **Birds**

Protection Island was established as a National Wildlife Refuge because unique characteristics of the island allow it to serve as a breeding ground and winter sanctuary for birds. The combination of soil conditions on the island and the compacted sandy bluffs along the southern slope of the island provide prime habitat for burrow-nesting birds, such as, Rhinoceros Auklets and Tufted Puffins. Their isolation from non-native predators and limited human disturbance make the island one of the most important seabird nesting locations in Washington State. Additionally, the presence of spit/berm habitat on the island provides unique nesting areas for seabirds. Protection Island, along with Smith and Minor Islands, represents the sole remaining areas in the Puget Sound where Rhinoceros Auklets nest (Scott Pearson, pers comm. 2010). Bald Eagles also have a large and increasing presence in the area due to the naturally high fecundity of other avian species that use the island, providing an alternative food source for the eagles.

The Miller and Quimper Peninsula uplands adjacent to the aquatic reserve include the undeveloped Miller Peninsula State Park, which is a prime location on the Pacific Flyway, attracting many migratory species of shorebirds and waterfowl in search of food and shelter. The massive high bluffs and relatively remote beaches along the shores of both peninsulas also provide exceptional habitat for burrow-nesting birds as well as a safe refuge for molting seaducks. Cormorants, Peregrine Falcons, Harlequin Ducks, and Bald Eagles, as well as many other seaducks, diving ducks, and shorebirds comprise the majority of the birds that have been observed using this portion of the eastern Straits of Juan de Fuca and the Olympic Peninsula.

Approximately 72 percent of the nesting seabird population of Puget Sound and the Strait of Juan de Fuca nest on Protection Island, which includes one of the largest nesting colonies of Rhinoceros Auklets in North America and the largest nesting colony of Glaucous-winged Gulls in Washington (US Fish and Wildlife Service 2010). Pearson (2009) estimated that there were 35,715 (95percent confidence interval) Rhinoceros Auklet pairs nesting on the Island in 2008. The island also

---

supports numerous nesting bird pairs, including Glaucous-winged Gulls, Tufted Puffins, Rhinoceros Auklets, Pigeon Guillemots, Double-crested Cormorants, Pelagic Cormorants, Black Oystercatchers, and Bald Eagle. A good number of marine birds also occur along the Miller Peninsula shoreline including Harlequin Ducks and migrating shorebirds. Other birds documented to use the shorelines and marine waters of the Protection Island unit include: the Marbled Murrelet, (which are year-round residents), Ancient Murrelets, Common Loon, Red-throated Loon, Black Brant, Surf Scoter, Western Grebe, Horned Grebe, which are winter residents (Admiralty Audubon, 2008). Seasonal WDNR priority bird use of the area includes: Harlequin Duck, Marbled Murrelet, Brown Pelican, and Common Loon.

The nearshore and deepwater habitats surrounding Protection Island are important to the survival of seabirds in Puget Sound. WDFW is conducting research on burrow nesting seabirds at both Protection Island and Smith and Minor Islands that is funded by PSAMP and Seadoc Society. USFWS has conducted long-term research on seabirds here as well. NOAA is also involved in research in the area, as is the University of Washington and the University of Puget Sound. A long-term study of Glaucous-winged Gulls is on-going and directed by Joe Galusha (Walla Walla College) and Jim Haywood (Andrews University).

For a comprehensive list of birds observed within the reserve boundaries refer to Appendix A. See Appendix B, Figures 4, 5, 7, and 8 for various species distribution maps.

### **Marine Mammals**

Harbor seals regularly use Protection Island for haul-out, molting, breeding, and pupping sites (US Fish and Wildlife Service 2010). Two major marine mammal haul-out areas occur on Protection Island. Harbor seals are regularly sprawled on the sandy spits on the west and east ends of the island and some of the sandy beaches on the south side of the island. These sites are used year-round as a resting site and serve as pup rearing sites from mid-June through mid-August. The island also provides the important seclusion necessary for harbor seals during their vulnerable molting time. Since this site also encompasses adult Pacific herring holding areas, (in particular the area northwest of Protection Island and the area along the mainland shoreline from Thompson Spit east to Cape George), it is important feeding grounds for the marine mammals that frequent the region.

Elephant seals also use Protection Island for haul-out and nursery habitat. During the breeding season, the elephant seal population increases to 30 – 40 (Jeffries, personal communication, 2009). Steller sea lions are known to haul-out on Protection Island beaches (USFWS) and occasionally California sea lions have been sighted here.

The waters around Protection Island are used by Southern Resident Orcas, a WDNR priority marine species also listed as endangered under the Endangered Species Act. Minke whales are commonly sighted in the area and gray whale usage has increased in more recent years. The shoreline also provides typical foraging habitat for river otters.

---

## **Invertebrates**

Beds of submerged aquatic vegetation in the nearshore of Protection Island and the Miller and Quimper Peninsulas are important habitats for shrimp and crab. Shrimp rely on submerged aquatic vegetation (eelgrass meadows and small macroalgae) for their juvenile and reproductive life history phases. Dungeness crab use eelgrass meadows and other submerged aquatic vegetation during all life phases, from juvenile through adult, for reproduction, predator refuge, and feeding (Aleta Erickson, Jamestown S’Klallam Tribe).

Biological staff employed by the Jamestown S’Klallam Tribe conduct annual ovigery and fecundity tests on spot shrimp in the deep water areas to the northwest of Protection Island in an area located inside the aquatic reserve. Tribal data show that mature shrimp are found in the deeper waters of the reserve, typically along the edges of deep water trenches, while juveniles are more common in shallower waters (Aleta Erickson, Jamestown S’Klallam Tribe).

Intertidal and subtidal unconsolidated mixed substrates within the reserve support diverse populations of intertidal clam species, geoduck, and large numbers of infaunal and epibenthic invertebrates and macroalgae. Nearshore vegetated habitats also sustain an abundance of associated invertebrate species, such as, other shrimps, mollusks, crabs, echinoderms, and a multitude of small crustaceans. These organisms as well as marine worms (polychaetes), sea stars (echinoderms), sea snails (marine gastropods), and a myriad of others serve as a vital link in the food chain. Algae and seagrass provide the food supply for these smaller organisms and these “primary consumers” in turn become prey resources for fish and birds, thus supporting the local populations of fishes, other birds, and mammals.

Red sea urchins have been abundant in this area and sustained a previously steady commercial fishery. Presently, the red urchin population in the eastern Strait is depressed, due in part to heavy fishing pressure in the late 1980s. Red urchin commercial harvest is currently closed in District 3 (eastern Strait). The area is still open to recreational harvest, but recreational harvest is likely insignificant, due to limits (daily limit of 18) and few reports of recreational take (Bob Sizemore, pers. comm. 2010).

## **Non-native Fauna and Flora**

There has not been a comprehensive survey for non-native species in this area; therefore, limited information is available about the distribution of non-native marine species for Washington State’s marine waters. There are several species that are monitored and controlled throughout the inland marine waters of Washington State. Regional programs focus on invasive species such as, *Spartina* spp., of which there is minimal suitable habitat in the Protection Island Aquatic Reserve (Washington State Department of Agriculture 2010). In general, this type of current swept regime does not have suitable habitat for the commonly known and most invasive species.

In 2007, WDFW listed six species of non-native invasive tunicates for priority and secondary invasive management. Dive groups throughout the sound are engaged in

---

noting occurrences and removal of some of these species where possible. While the habitat around the reserve is not conducive to settlement and invasion, it is unknown whether these species are present in the area (Washington Department of Fish and Wildlife 2009).

Other monitoring efforts have documented the presence of *Sargassum muticum* around the Protection Island region (Washington Shorezone Inventory 2001). *Sargassum muticum* is considered an invasive brown alga, which competes for space with non-floating kelp and other large brown algae and can have a negative impact on abundance (Britton-Simmons 2004). While the more rigorous currents farther out on Dallas Bank are not conducive for *Sargassum*, settlement has occurred along the Miller Peninsula and Quimper Peninsula.

### **Conservation Targets**

The following conservation targets have been identified through the designation process as unique or at risk in the region by WDNR's Habitat Conservation Plan, the WDFW's Priority Habitats and Species program, the 2009 Aquatic Reserves Program Technical Advisory Committee, and the Protection Island Planning Advisory Committee. These priority species and habitats will benefit from additional conservation measures implemented through this management plan. By identifying conservation targets, management actions can be developed and implemented that are consistent with the protection needs of the conservation targets. By focusing management efforts on priority species and habitats it is possible to develop management strategies with realistic goals that will inherently subsume other species and habitats in protective management decisions. For a complete list of species that have been identified in, or regularly use the region, see Appendix A.

#### **1. Unique Ecosystem Characteristics**

- a) Confluence of two major waterways, Strait of Juan de Fuca and Admiralty Inlet, and strong tidal currents support upwelling of nutrient rich water and the mixing of denser, more saline ocean water with the less dense and saline estuary conditions of the Puget Sound region.
- b) Sandy beaches, spits, northern facing feeder bluffs, and southern facing gentle bluffs – maintain these features in an undisturbed condition and support nesting seabirds such as Rhinoceros Auklets, Pigeon Guillemot, and Tufted Puffins as well as forage fish spawning habitat that provides food sources to seabirds, salmon, and marine mammals.
- c) Undeveloped glacial till islands and sandy bluffs of the nature exhibited within the reserve, the abundance and rarity of nesting seabirds, and the reserve site's unique landscape position at the juncture of the Strait of Juan de Fuca seem rare among the known network of sites.
- d) Seagrass and kelp beds – support primary production and detritus based food webs in the vicinity of the reserve. Cryptic invertebrate species and rockfish juveniles depend on eelgrass and kelp for cover. Eelgrass and kelp beds buffer



---

tidal currents allowing sediments suspended by storm waves to resettle more quickly than on shorelines without kelp or eelgrass (USGS CHIPS, 2008).

- e) Benthic and open water habitats, including areas of high tidal activity and a diversity of depth and bottom types, support region-wide biological diversity, and food production for birds, fish and marine mammals within the reserve.

## **2. Aquatic Vegetation and Habitat**

- a) Supports a unique, submerged vegetation community. High diversity and abundance of three species of sea grasses and deepwater beds of *Zostera marina* (eelgrass), *Phyllospadix* spp.
- b) Wide-bladed *Desmerestia* spp. is the dominant species in an area of Dallas Bank. This native species of large brown algae normally dominates marine habitats in South America, rather than Puget Sound.
- c) Kelp beds and shallow sandy shelf support fish, bird, and mammalian species forage and rearing areas.
- d) Extremely strong bottom currents on the outer bank move kelp, and the rocks they are attached to, to depths where they do not usually occur.
- e) Contains pre-spawn holding area for Discovery Bay herring and sand lance spawning beaches.

Species: *Nereocystis* Kelp, *Zostera marina*, *Phyllospadix* spp., *Desmerestia* spp., Red algae, Brown algae, Green algae

## **3. Bird Populations**

- a) Pigeon Guillemots, Tufted Puffins and Rhinoceros Auklets and Cormorants are supported by strong benthic and pelagic habitats.
- b) Marbled Murrelets and Harlequin Duck are supported year- round, while many more species are supported during the winter months (Common Loons, Black Brant, Surf Scoters)

Species: Pigeon Guillemots, Tufted Puffins, Rhinoceros Auklets, Marbled Murrelets, Harlequin Duck, Common Loon, Black Brant, Surf Scoters, Brown Pelican, Bald Eagle, Western Grebes, Horned Grebes, Pelagic Cormorant, Double-crested Cormorant, Red-necked Phalarope, Black Oystercatchers.

## **4. Marine Mammal Populations**

- a) Protection Island is an important seal pupping and haul-out site due to the lack of predators and human disturbance.

- 
- b) Area around Protection Island is important feeding grounds for Southern Resident J, K and L Orca Pods.

Species: Harbor seal, Elephant seal, Steller sea lion, Southern Resident Orcas, Gray whales,

## 5. Fish Populations

- a) High diversity and abundance of benthic (bottom) fish and crustaceans in the Dallas Bank region and around Protection Island.
- b) The area is used extensively by juvenile salmonids from spawning rivers outside the region.
- c) WDFW trawl surveys have identified 140 different fish species within the proposed boundaries.

Species: Pacific herring, salmon, surf smelt, Pacific sand lance, Pacific cod, ling cod, rockfish, rock sole

## II. Current Conditions

The current ecological condition of the site reflects an extremely low degree of alteration from its natural state and is in overall excellent condition. There is one over-water structure within the reserve boundary at Protection Island on the south side in the small dredged harbor. There are five mooring buoys within the project site along the Miller Peninsula shoreline. There are no over-water structures or bulkheads located along the Quimper Peninsula portion of the site, which consists of high bluff bank with intact riparian vegetation. There are a few creosote pilings that exist within the reserve boundary from an old dock on the northern shore of Diamond Point. The state-owned DNR managed tidelands make up approximately 75 percent of the shoreline of this proposal. Protection Island is among the few remaining undeveloped glacial till islands in Puget Sound with surrounding nutrient rich waters that harbor abundant sea life.

The majority of the project area is adjacent to dramatically high bluff beaches; the beaches below are unperturbed by human alterations. Littoral drift processes on Protection Island and the shorelines adjacent to the reserve on Miller and Quimper Peninsula are functionally intact. Shoreline processes on the island and on Miller and Quimper Peninsulas appear largely intact but development near Diamond Lagoon has resulted in moderate levels of shoreline armoring. Since this armoring is located at the terminal end of the littoral drift cell, it is unlikely to have a significant adverse effect on natural sediment transport processes within the reserve.

With respect to ecological and physiochemical processes, this site captures tidal confluence of two major water bodies: Strait of Juan de Fuca and Admiralty Inlet. Strong tidal currents in the waters of Admiralty Inlet support upwelling of nutrient rich water to the surface where it supports phytoplankton blooms and concentration of forage fish. Strong currents from Admiralty Inlet also prevent large amounts of



---

direct mixing of northern Rosario Strait waters with those around Protection Island (Khangonkar, et al. 2007). The nearshore environments within the proposed reserve boundaries support extensive eelgrass and kelp beds and the diversity of depths and bottom types throughout the reserve area are thought to also present opportunity for equally diverse subtidal habitats. The reserve also captures large unscathed bathymetric and substrate diversity.

Protection Island contains rock, sand and gravel substrates, with varying exposure to currents, resulting in highly diverse flora and fauna (DNR, 2006). However, habitats in the region have not been well studied. Eighteen years ago rich kelp beds existed on the western side of Protection Island (Nightingale, 2000). These kelp beds began gradually disappearing in 1990 and almost completely disappeared by 1996. However, a large, rich eelgrass bed is now located on the northwest side of Protection Island (WDNR Nearshore habitat program, 2001). The disappearance of kelp around Protection Island is an inexplicable mystery at this point in time. Historically the shoreline just west of Diamond Point (which is outside the reserve boundary) also contained large areas of kelp. These have disappeared (Appendix B, Figure 3), but kelp has more recently been found on the Quimper Peninsula east of Cape George (within the reserve boundary).

There is only one Class-A (WAC 246-272A-0110) treated outfall just west of the aquatic reserve boundary operated by the city of Sequim. This outfall is continually monitored and has not affected the sediment quality or water quality in the region to any degree of concern.

The area includes sufficient habitat to support viable populations of finfish, mammals, and invertebrates. The site is identified as a high priority and biologically diverse area by the Nature Conservancy Puget Trough/Georgia Basin Ecoregional plan (2002) and contains DNR priority marine habitats, including intertidal and subtidal zones, deepwater tidal habitats, consolidated substrates, and vegetated marine estuarine habitats that captures high biological diversity, important biological and physiochemical process, vulnerable habitats, life stages, and populations, and species of special concern. Vulnerable habitats and life stages for populations within the reserve include: breeding seabirds and marine mammals, kelp and eelgrass beds that support juvenile rockfish and salmon, and Dungeness crabs.

Harbor seals use Protection Island for haul-out and breeding. Elephant seals also use the islands for haul-out and breeding, while Steller sea lions are occasionally observed in the area and have incidentally been observed hauled-out on the beaches (US Fish and Wildlife Service 2010). USFWS and WDFW have long-term research projects to monitor breeding populations of seabirds, seals and sea lions, as well as transient populations of northern elephant seals. This provides another excellent opportunity to build on existing scientific activities. The waters around Protection Island are used by Southern Resident Orcas, a DNR priority marine species also listed as endangered under the Endangered Species Act.

Port Townsend Marine Science Center maintains existing infrastructure for environmental education and scientific research. This provides an excellent opportunity to build on existing educational and scientific activities. DNR will

---

partner with the Port Townsend Marine Science Center when possible to support and promote environmental education opportunities related to the Protection Island Aquatic Reserve.

### **III. Potential Future Impacts**

The Protection Island Aquatic Reserve is susceptible to a plethora of potential future impacts stemming from expanding upland development to increasing recreational and commercial tideland and overwater use. DNR has the authority to manage only state-owned tidelands and bedlands. Nonetheless, because other potential uses adjacent or near the reserve may have indirect impacts on the reserve, development of a comprehensive management plan requires identification and acknowledgment of off-reserve influences..

Construction of new hard shoreline armoring, marinas, and overwater structures adjacent to or within the reserve are an ecological concern. These activities should be avoided in favor of more habitat friendly alternatives. Other potential future activities that might pose a threat to the site are difficult to identify. Because the site is relatively isolated from urban shoreline development, it may be vulnerable to activities or land uses for which a remote site is preferred, such as energy utilities, resorts and marinas, and some types of commercial aquaculture. Activities within the reserve that could (1) increase the risk of major disturbance or entrapment of birds or marine mammals, (2) degrade water quality, or (3) interfere with food web interactions on state-owned aquatic lands are of major concern..

The following identifies and discusses other potential threats to aquatic resources within the reserve, including future land use scenarios, commercial and recreational shellfish harvest and aquaculture, water and sediment quality and hydraulic modification, energy pipeline or transmission line rights of ways, wind energy facilities, oil spill scenarios, increased naval activity, increased recreational use and mooring buoys, and climate change.

#### **Future Land Use Scenarios**

Some of the potential impacts of increased upland development that may affect the reserve arise from ground water withdrawal and sewage treatment. The population of the northeastern Olympic Peninsula region has increased dramatically in recent years. The population of Sequim has grown at a rate of 34 percent since 2000; the growth rate is projected to continue into the future. The current population of Sequim is approximately 5,809 (2008 estimate). This rapidly growing area, which is near the southwestern portion of the Reserve, may cause future impacts to the natural resources within the reserve. Port Townsend, while not an area of anticipated future growth impact, has grown at a rate of 9.6 percent since 2000 with a population of 9,133 (2008 estimate). The potential for further development along the northern shore of Miller Peninsula is minimal, excluding possible State Park facilities. The likelihood that the section of Quimper Peninsula adjacent to the reserve will become developed is also minimal given the shoreline designations, however the possibility of future outfalls from any unforeseen developments must be acknowledged.

---

Construction of any new hard shoreline armoring and overwater structures has the potential to conflict with reserve goals for habitat protection. Partnerships with USFWS, WDFW, State Parks, and Clallam and Jefferson Counties will be needed to ensure adequate protection of natural resources. Education and outreach with adjacent property owners will also be necessary; in addition to partnerships with these agencies, assistance from Beach Watchers, MRC's and other volunteer organizations may be needed.

### **Commercial and Recreational Shellfish Harvest and Aquaculture**

Fishing, crabbing, shellfish harvest, and other wildlife activities occur within or adjacent to the Reserve. DNR has no authority to regulate tribal, commercial or recreational fisheries, but DNR authorizes activities like non-tribal commercial harvest of wild geoduck and aquaculture operations on state-owned aquatic lands through contracts and lease agreements. Harvest of wild geoducks is currently taking place within the reserve on a small scale, and will likely take place in the future. No conflicts with the reserve designation have been identified concerning the harvest of wildstock geoducks. However, commercial aquaculture of finfish and similar practices could conflict with a goal to protect natural species, as birds and other species may be attracted to the farms and get entrapped in predator exclusion devices, or the facilities may degrade water quality. WDFW currently prohibits commercial trawling for finfish, which has the potential for significant impacts.

### **Water and Sediment Quality and Hydraulic Modifications**

Possible future uses that may impact sediment and water quality or hydraulic conditions at the site include the potential for oil spills (catastrophic and chronic), possible expansion of Sequim's water treatment system, migration of sediment from a nearby dredge disposal site, and possible tidal energy development in the Puget Sound.

A pilot scale tidal energy project is currently proposed in Admiralty Inlet, approximately 6 miles east of the reserve boundary. Hydrologic modeling conducted by the University of Washington (Polagye et al. 2009) suggests no measurable change to tidal hydrology as a result of this pilot project. However, if tidal energy is developed in the Puget Sound Strait of Juan de Fuca area at a large commercial scale in the future, impacts to the reserve could be possible. A significant change in tidal hydrology at the reserve or increased risk of oil spills from increased vessel activity could adversely impact sensitive habitats and species health and diversity.

No residual effects of past oil spills or other contamination have been documented in the region and are probably non-existent in the water and sediment column (Johnson 1997 and Johnson 2000). Increased development could create a scenario for increased contaminant runoff during early fall rains when oil and other contaminant buildup are released from impervious surfaces into overland flow.

Chronic leaking of gas and oil from boats is also an important factor of water and sediment quality in the region. Two marinas located near the Reserve generate vessel traffic that crosses the Reserve.

---

Though there is, at present, only one Class-A treated outfall in the vicinity of the Reserve (serving the City of Sequim). The possible expansion of Sequim's urban growth area may require additional outfalls.

While there is no immediate threat from the Port Townsend dispersive dredge material disposal site that lies approximately ½ mile (0.8 kilometer) northwest of the most northern boundary of the reserve, the site may cause impacts in the future. The site is located in 361 feet (110 m) of water at latitude 48N 13.61' longitude 122W 59.03' with a 3,000 foot (914 m) diameter circle disposal zone and a 7000 foot (2133 m) diameter circle disposal site (Appendix B, Figure 13). The site is classified as a dispersive site making the movement of disposed material known and monitored as well as the potential contamination of the material.

### **Energy Pipeline or Transmission Line Rights of Ways**

Cable or pipeline rights of way, easements, or leases could seriously damage the habitats in the Protection Island Aquatic Reserve. There is currently only one cable easement beginning on the eastern side of the northern shore of Miller Peninsula.

### **Wind Energy Facilities**

No land based or offshore wind energy projects are currently planned near the reserve site; however, improper siting of wind energy facilities on land has led to a unwarranted number of collisions of certain bird species with wind turbines (Drewitt and Langston, 2006), and oceanographic currents if anchored in bedlands. Due to the high concentration of birds in the reserve area, wind turbines could have adverse impacts on birds if inappropriately sited

### **Oil Spill Scenarios**

A major east-west navigational shipping channel runs directly through the most northern portion of the reserve, north of Dallas Bank. This shipping channel receives heavy traffic by oil tankers destined for Anacortes and Cherry Point. The Coast Guard has necessary procedures and technologies in place to significantly reduce the likelihood of oil spills or minimize spill volume. However, small scale spills have occurred in the past and the possibility exists for future spills. Washington Department of Ecology's (2003) Oil Spill Response Plan established booming strategies to protect sensitive areas throughout the Sound.

### **Naval Activity**

Navy Region Northwest facilities and fleets extensively use the area around and possibly within the Protection Island Aquatic Reserve. The Navy's operations and maneuvers in the region have not been identified as having negative impacts on the aquatic resources within or adjacent to the reserve..

### **Recreational Use and Mooring Buoys**

The reserve is situated at the mouth of Sequim Bay and Discovery Bay, in which there are two marinas, John Wayne Marina in Sequim Bay, and the privately owned Cape George Colony Club Marina in Discovery Bay. The reserve area is extensively used for recreational boating, particularly the waters between Protection Island and Miller and Quimper Peninsulas. Due to close proximity to other desirable recreational

---

boating destinations and possible expansion of residential developments and recreational fishing in the vicinity of the island, the potential of higher use and increased impacts exists. Increased boating traffic increases the likelihood of impacts of litter, and physical and chemical impacts to nearshore environment (including prop scour, chronic lubricant and fuel leakage, and shading of aquatic vegetation) as well as, increased damage to submerged aquatic vegetation from anchoring, and gear loss.

Anecdotal information indicates marine vessels occasionally use the leeward side of Protection Island for anchoring to shelter boaters during storm events. This emergency anchorage may be necessary, but may cause impacts to eelgrass, kelp and other sensitive habitats.

### **Climate Change Scenarios**

Global climate change is likely to impact the Protection Island Aquatic Reserve area if future predictions of sea-level rise and increased storm events and flooding occur. Future sea-level rise due to anthropogenic climate change is expected to increase in the Puget Sound Region, and estimates regarding the northern Puget Sound indicate an annual increase of .04 - .1 inches (1 - 2.5 mm) per year. A University of Washington Climate Impacts Group study places 2050 sea-level rise values for Puget Sound at 3.1 inches (8 cm), 5.9 inches (15 cm), and 21.7 inches (55 cm) for low, moderate, and high scenarios respectively. 2100 values are 6.3 inches (16 cm), 13.4 inches (34 cm), and 50.4 inches (128 cm) for low, moderate, and high scenarios respectively (Mote, et al. 2008, p 10). This rise in sea-level will result in increased coastal erosion, and potential disappearance of the spits on Protection Island and the Miller Peninsula at high tides, as well as an appreciable reduction of the already diminishing land mass of this exposed island. Changes in the tidal prism, current regime, and permanent inundation of salt marsh areas and vegetated spit/berm locations will significantly reduce the available habitat for nesting seabirds, as well as diminishing the availability of suitable haul-out and pupping areas for seals.

## **IV. Archeological, Cultural and Historic Resources**

According to the Washington Information System for Architectural and Archaeological Record Data, available on the Department of Architectural and Historical Preservation website, there are several upland sites adjacent to the proposed reserve boundaries; none of these sites are located on state-owned aquatic lands or on the beach. Aquatic reserve designation can ensure that future leases will be compatible with natural and cultural resource protection.

Protection Island and the Miller and Quimper Peninsula are culturally important areas for the S'Klallam Tribes (Jamestown, Port Gamble, and Lower Elwha). The proposed reserves are located within the usual and accustomed fishing areas (U&A) of these and other tribes. Tribal citizens actively harvest finfish, shrimp, crab, and other invertebrates from these waters for commercial, subsistence, and ceremonial purposes. In times past there were S'Klallam villages at Diamond Point and Beckett Point (Aleta Erickson, pers. comm. Jamestown S'Klallam Tribe).

---

---



## 4. Management Goals & Objectives

The primary focus in managing the Protection Island Aquatic Reserve is to protect and restore the regions natural biological communities, habitats, ecosystems and processes, and the ecological services, uses and values they provide to current and future generations. This section of the plan identifies the desired future conditions of the site and provides goals and objectives to help ensure that these desired conditions can be met.

### Desired Future Conditions

Desired Future Conditions describe the overall target conditions for a landscape and provide guidance for developing management goals and objectives. The following describes the future environmental conditions expected at the Protection Island Aquatic Reserve when the management goals and objectives in the plan are achieved.

The Protection Island Aquatic Reserve Management Plan ensures strong protection of the state-owned aquatic lands in an effort to prevent further habitat degradation. The plan emphasizes protection over restoration to reduce current habitat degradation and preserve natural processes that support a healthy nearshore environment. The Protection Island Aquatic Reserve is an excellent example of a region that up until the present has not suffered major impacts and thus has markedly less restoration potential than some other existing reserves. However, shoreline restoration efforts may lead to improved spawning and rearing habitat for important fish species such as salmon, herring, surf smelt and sand lance. Protecting current ecological conditions should ensure foraging opportunities for resident and migratory birds and waterfowl.

Emphasis also will be placed on building partnerships with adjacent land owners, land managers, and local stakeholder organizations in an effort to address negative effects from conditions of adjacent areas to the Protection Island Aquatic Reserve and continued public use. Efforts will focus on reducing water quality impacts to the aquatic reserve and the adjacent nearshore areas.

The Protection Island Aquatic Reserve is designated as an educational reserve and therefore promotes responsible environmental behavior by supporting any projects or programs that help educate an ‘environmentally literate citizenry’. The accessibility of the site, via state-owned uplands on Quimper and Miller Peninsula’s, provides for environmental education opportunities. The Protection Island Aquatic Reserve Management Plan will pursue various mediums of instruction about conservation, natural resources, and the environment and support the requirement that education be provided at all grade levels, as required by state law (RCW 28A.230.020).

To achieve these future conditions, this Management Plan incorporates the following goals and objectives. The objectives are a product of the research, analysis, advisory



---

committee meetings, and public input during the Protection Island Aquatic Reserve management planning process.

**Goal One:** Preserve, restore, and enhance the functions and natural processes of the aquatic lands and environment within the reserve.

**Objectives**

- 1.1 Protect and avoid interference with natural processes that promote region-wide biological diversity in the regions marine environments by maintaining the low levels of alterations and restoring native habitats and native species diversity to the Protection Island Aquatic Reserve.
- 1.2 Identify areas containing outstanding examples of native biological communities and support any possible restoration efforts when necessary. Protection of such identified areas is a priority of the Protection Island Aquatic Reserve.
- 1.3 Ensure public activities within the reserve that DNR has management authority over are conducted in a manner that do not harm or degrade the natural, cultural, and scenic resources of the region. Where impacts are inconsistent with program goals, change or restrict use/activity. Restore or enhance sites where necessary and when possible.
- 1.4 Identify partners in facilitating emergency oil-spill response for the reserve area with regard to planning, pre-response infrastructure, and funding.
- 1.5 Give high priority to the removal of harmful disturbances by providing and supporting removal and cleanup efforts.
- 1.6 Protect unique oceanographic and geomorphic conditions that support conservation targets by planning management activities and future site developments to minimize alterations to documented drift cell, tidal, wind, and wave regimes.
- 1.7 Identify opportunities to partner with upland land owners on restoration projects that would indirectly benefit the reserves ecological health.

**Goal Two:** Support opportunities for scientific research by supporting activities that survey and monitor sensitive habitats, species, and natural processes.

**Objectives**

- 2.1 Establish a baseline inventory of current ecological conditions and the habitats and species found in the reserve area.
- 2.2 Explore potential partnerships for water quality monitoring.



- 
- 2.3 Develop long term monitoring plans to evaluate status and trends of conservation targets to guide future management decisions.
  - 2.4 Establish data collection and recording standards and facilitate availability of collected data in a data repository that can be added to and accessed by various research entities.
  - 2.5 Establish partnerships with research organizations and institutions to facilitate the collection of a broader range of data and to promote research sharing and cooperation.
  - 2.6 Support climate change research opportunities pertaining to potential effects to conservation targets or the unique oceanographic and geomorphic conditions that support them.

**Goal Three:** Support and provide opportunities for outdoor education and interpretive studies.

**Objectives**

- 3.1 Explore and support environmental education opportunities and partnerships with other organizations and agencies that frequently operate in the region.
- 3.2 Identify and support educational opportunities associated with scientific research, restoration and monitoring.
- 3.3 Use education facilities to inform the public of ecological, geologic, cultural, and historic components of the area. Consult with local tribes in developing interpretive materials that address culturally sensitive resources/topics.
- 3.4 Use interpretive information, such as educational signage, to convey conservation ethics and stewardship etiquette of the reserve and enhance respect and understanding of the region's resources and the purpose of protecting them.
- 3.5 Inform the public of allowed and other uses management within the context of environmental education.

**Goal Four:** Collaborate with other reserve management partners, programs, and management actions to ensure connectivity across the Aquatic Reserve Program.

**Objectives**

- 4.1 Coordinate environmental education opportunities and partnerships with other reserve education programs.
- 4.2 Ensure research and monitoring standards are consistent with other reserve management plans.
- 4.3 Coordinate with the USFWS and Washington State Parks to ensure protection connectivity between the Protection Island Aquatic Reserve, the Protection

---

Island National Wildlife Refuge, and other parks, such as the proposed Miller Peninsula State Park.



---

## 5. Management Actions

The Protection Island Aquatic Reserve will be managed for the preservation of natural environmental conditions while encouraging low impact public use opportunities where such opportunities do not adversely affect the resource values the area is intended to protect. The management actions are intended to improve the ecological condition of the reserve and assist in the adaptive management process that occurs after the first 10 years of implementation. Management of marine resources will be conducted in accordance with the management actions identified in this plan.

Since negative impacts to sensitive habitats and species within the reserve may also be attributed to activities over which DNR does not have explicit authority or control, DNR will seek cooperation and collaboration from other public and private entities, specifically local governments and citizens, regarding the management actions of the Protection Island Aquatic Reserve. DNR will work cooperatively with the recognized tribes in section 2, WDFW, Jefferson and Clallam Counties, and the City of Sequim and others to incorporate relevant ‘best management practices’ into the management of the reserve.

This section details the actions that should be carried out over the initial 10 years of reserve designation. The following actions address the goals and objectives identified in section 4.

Reserve management can be divided into five primary categories:

- I. Resource protection, enhancement and restoration
- II. Monitoring and research activities within the reserve
- III. Environmental education
- IV. Allowable uses of the reserve
- V. Other uses within the reserve

### I. Resource Protection, Enhancement, and Restoration

The Protection Island Aquatic Reserve management actions are designed to maintain sensitive aquatic resources, plan for existing and future uses of state-owned lands, direct public use, and facilitate stewardship, research, and monitoring. Restoration activities will focus on re-establishing the natural processes and, where management is necessary and feasible, enhancing habitat and ecosystem quality or reversing and mitigating degradation.

---

The components to resource protection, enhancement, and restoration within the Protection Island Aquatic Reserve are developed in the following sections.

## **A. Protection**

Protection of aquatic resources within the Protection Island Aquatic Reserve is primarily achieved by ensuring DNR authorizations are consistent with the goals, objectives, and management actions. Where opportunities arise, DNR will partner with state and local governments, tribes, non-profit organizations, businesses and adjacent landowners to identify and implement protective practices within the reserve and adjacent aquatic areas and uplands. When appropriate, DNR will facilitate the development of site-specific habitat protection plans.

### **Management Actions**

1. Develop partnerships to encourage placement of important habitat on adjacent lands into conservation easements.  
**Meets Objectives 1.1, 1.2, 1.3**
2. Emphasize acquisition of adjacent tidelands and shoreline property through gifts.  
**Meets Objectives 1.1, 1.2, 1.3**
3. Continue to recognize and support the Commissioner of Public Lands withdrawal order 88-107 dated 22 November 1988 for bedlands around Protection Island.  
**Meets Objectives 1.1, 1.2, 1.3, 1.4, 3.2**
4. Support renewal of aquatic land lease (No. 20-013245) for the second class tidelands around Protection Island to the USFWS.  
**Meets Objectives 1.1, 1.2, 1.3, 1.4, 3.2**
5. Allow succession and other natural processes to operate unimpeded.  
**Meets Objectives 1.1, 1.2, 1.3, 1.7**
6. Close or restrict public use in critical habitat as required to protect the habitat.  
**Meets Objectives 1.4**
7. Prioritize protection of existing kelp beds within the reserve above all other potential uses.  
**Meets Objectives 1.1, 1.2, 1.3,**

## **B. Enhancement**

DNR will facilitate and encourage the restoration of natural processes and habitats; however if restoration is not currently feasible or if habitat degradation needs to be addressed more quickly, enhancement of habitat and species may be conducted to prevent further degradation. When necessary, enhancement plans will be developed and will include involvement from all relevant parties including state and local governments, tribes, non-profit organizations, businesses and affected landowners.

---

### **Management Actions**

1. Support emergency enhancement activities that mitigate the effects of oil-spills.

**Meets Objectives 1.5**

2. Work with partners to identify potential enhancement activities that will support the management of the reserve.

**Meets Objectives 1.4, 1.6**

### **C. Restoration**

DNR Aquatic Reserves Program will, when necessary, develop restoration plans for specific areas and species in the Protection Island Aquatic Reserve. DNR will partner with state and local governments, tribes, non-profit organizations and adjacent landowners, where possible, to assist in the development and guidance of restoration plans. Specific areas where restoration efforts are being considered and/or pursued by DNR follow.

### **Management Actions**

1. Control invasive species populations to avoid habitat damage.

**Meets Objectives 1.3, 1.4**

2. Evaluate and approve new proposals for restoration projects on state-owned aquatic lands within the reserve. DNR Aquatic Reserves Program staff will support only those proposals that are consistent with the management of the reserve.

**Meets Objectives 1.3, 1.4, 1.5**

3. Support activities, whether DNR-led or otherwise, that restore environments damaged by human-produced disturbances by removing derelict or ghost fishing gear, creosote pilings, derelict vessels, abandoned utilities, or any other human-created products that are damaging the aquatic environment and not promoting the goals and objectives of the reserve.

**Meets Objectives 1.4, 1.6**

4. Support efforts to connect management activities with existing restoration projects and plans for the area.

**Meets Objectives 2.6, 4.2**

5. Prioritize restoration projects that support the prosperity of endangered, threatened or sensitive species and habitat.

**Meets Objectives 1.1, 1.3, 1.4**

## **II. Research and Monitoring**

DNR will seek to partner with local and state governments, tribes, universities, non-profit organizations and the local community to identify and develop research projects within the reserve. All research activities that occur within the Protection

---

Island Aquatic Reserve must not result in damage to the ecosystem and must meet the goals and objectives of the reserve.

Identifying gaps in data collected of species assemblages, habitat distribution, and environmental processes within the Protection Island Aquatic Reserve will help managers determine baseline conditions to help inform research at the site. After baseline conditions have been identified, continued monitoring for trends in habitat and species conditions should be conducted. Research can compliment trend monitoring by providing possible answers for why species, habitats, and processes may be declining or improving. The following sections further describe the different components of monitoring and research and identify management actions for each.

There are three components to research and monitoring within the aquatic reserve:

- A. Identification of data gaps, baseline inventory to fill gaps and establish standards for trend monitoring.
- B. Trend monitoring to determine the effectiveness of management activities and document natural variation.
- C. Research to better understand observed changes and the interactions between management activities and natural resource conditions.

## **A. Data Gap Identification and Baseline Inventory**

Effective adaptive management of aquatic resources within the Protection Island Aquatic Reserve relies on having appropriate data. In order to gauge the success of management actions the current quality of the ecosystem needs to be established in a baseline inventory. Baseline inventory will document current conditions by combining existing data with inventories of resources and ecological processes that are not adequately documented. Through development of the management plan DNR has identified areas where data is not available, current or complete. The following data gaps are where baseline research will be concentrated.

### **Management Actions**

1. Identify and characterize harmful human induced disturbances, derelict or ghost commercial and recreational fishing, crabbing, and shrimping gear, derelict vessels, creosote pilings, abandoned utilities, or any other human-created product that is possibly damaging the aquatic environment and not promoting the goals and objectives of the reserve.

**Meets Objectives 1.6, 2.2**

2. Partner with WSU's Beach Watchers to survey for possible forage fish spawning beach locations.

**Meets Objectives 2.1, 2.3, 2.4, 2.5**

3. Support intertidal sampling and eelgrass mapping efforts.

**Meets Objectives 2.1, 2.3, 2.5,**

4. Collaborate with local, state, federal, and tribal governments, and local non-profits to inventory what data exists for the region and support a collective data repository.



---

**Meets Objectives 2.1, 2.4, 2.5, 2.6**

5. Coordinate with private, governmental, and tribal partners, to continually identify data gaps and organize inventory efforts, data collection standards.

**Meets Objectives 2.4, 2.6**

6. Identify native and sensitive habitat to prioritize inventory efforts.

**Meets Objectives 1.3, 2.1**

7. Support efforts to identify valuable resources previously unknown to the region.

**Meets Objectives 2.1, 2.3, 2.6**

8. Establish a dataset cataloging current shoreline alterations and the condition of the shoreline on a drift cell scale, which will require data outside the reserve boundary.

**Meets Objectives 2.3**

## **B. Trend Monitoring**

After baseline conditions have been identified, trend monitoring will be implemented to identify ecological trends that will be used to assess whether management actions attain or exceed the goals identified in this plan. Monitoring needs have been identified by the USFWS as a need to understand and sustain healthy populations of refuge wildlife and habitats, especially for seabirds. There is great potential for monitoring partnerships between DNR, refuge and sanctuary managers, and state parks that will provide information that can determine the need for alterations in management strategies over time. DNR will make building partnerships with local, state, and federal governments, tribes, local non-profits and business a priority to conducting trend monitoring. DNR will also support any opportunities that arise for citizen science. Current and future trend analysis data that will help guide and inform management of the aquatic reserve follows.

### **Management Actions**

1. Identify and monitor activities that have the potential for disturbing nesting sea birds and mammals.

**Meets Objectives 2.1, 2.3**

2. Monitor the effects of climate change (sea-level rise, ocean acidification, seasonal changes in salinity) on the aquatic resources within the reserve.

**Meets Objectives 2.3, 2.5**

3. Conduct forage fish spawning surveys in partnership with WDFW and WSU Beach Watchers.

**Meets Objectives 2.1, 2.4, 2.5**

4. Support and partner on monitoring programs in support of the reserve's goals and objectives.

---

### **Meets Objectives 2.6**

5. Monitor the effects of shoreline armoring, if any, on the function and integrity of documented drift cells.

**Meets Objectives 1.7, 2.1**

6. Focus monitoring efforts on native *Nereocystis* kelp beds.

**Meets Objectives 2.1, 2.4, 2.5**

## **C. Research**

DNR will seek to partner with local and state governments, tribes, universities, non-profit organizations and the local community to identify and develop research projects within the reserve. All research activities that occur within the Protection Island Aquatic Reserve must not result in damage to the ecosystem and must meet the goals and objectives of the reserve.

WDFW is conducting research on burrowing nesting seabirds at both Protection Island and Smith Islands that is funded by PSAMP and Seadoc Society. USFWS have conducted long term research on seabirds here as well. Additional management actions may include:

### **Management Actions**

1. Work with anyone interested in proposing research in support of the reserve's goals and objectives.

**Meets Objectives 2.1, 2.5**

2. Ensure the scope of research and studies is appropriate for comprehensive management of the Protection Island Aquatic Reserve.

**Meets Objectives 2.3, 2.5, 2.6**

3. Support and partner with, when possible, WSU's Beach Watchers intertidal sampling and data collection efforts.

**Meets Objectives 2.3, 2.4, 2.5**

4. Support research parameters characterized in a context that contribute to and are appropriate for between-site comparisons across the network of aquatic reserves and marine protected areas throughout Puget Sound.

**Meets Objectives 2.5, 2.6**

5. Research opportunities exist within the reserve for studying oceanographic influences of two major waterways: Strait of Juan de Fuca and Admiralty Inlet, and how they affect the larger Salish Sea.

**Meets Objectives 1.6, 2.1, 2.3**

6. Prioritize research proposals that focus on threatened or endangered species and habitat.

**Meets Objectives 1.1, 2.1, 2.3**

---

## III. Environmental Education

The Protection Island Aquatic Reserve is designated as an educational aquatic reserve and it is identified that existing partnerships and proximity to other protected environments presents a unique opportunity to support environmental education. Environmental education will be developed, as opportunities arise, to enhance public awareness and care for the outstanding historic, cultural, geologic, ecological, and aesthetic values of the Protection Island and northern Olympic Peninsula region. When possible, interpretive materials that include tribal culture and history will be developed in consultation with local tribes.

### Management Actions

1. Support signage efforts, and provide funding when possible, at public access points, and other areas, to convey conservation ethics and stewardship etiquette of the reserve.  
**Meets Objectives 3.1, 3.2, 3.3**
2. Work cooperatively with local tribes, other natural resource agencies and/or private institutions to develop appropriate interpretive materials and activities.  
**Meets Objectives 3.1**
3. Support, and when possible partner with efforts of local environmental education stewards such as Service, Education, Adventure (SEA), Salish Sea Expeditions, Port Townsend Marine Science Center, and other potential environmental educators.  
**Meets Objectives 3.1, 3.2**

## IV. Allowable Uses

The only DNR authorizations currently in the Protection Island Aquatic Reserve are tidelands management agreements with Washington State Parks, the USFWS withdrawal and lease agreements, and a utility cable easement. These current authorized uses on state-owned aquatic lands will continue as the uses serve the goals and objectives and are consistent with the reserves management actions previously listed.

Following are the only uses of state-owned aquatic lands that DNR will consider in the Protection Island Aquatic Reserve:

### A. Adjacent Aquatic lands and Uplands

#### Management Actions

1. Strive to improve communication between other local, state, and federal agencies on permitting applications for activities in and adjacent to the reserve.  
**Meets Objectives 1.1, 1.2, 1.4, 1.7, 2.5, 2.6, 3.1, 3.2, 3.4, 3.5, 4.1, 4.2**

---

## **B. Resource Protection, Enhancement, and Restoration**

### **Management Actions**

1. Allow actions that protect, enhance, and restore the Protection Island Aquatic Reserve within the aquatic reserve if conducted under a plan approved by DNR.

**Meets Objectives 1.1, 1.2, 1.3, 1.4, 1.5, 2.2, 2.6, 3.1**

## **C. Research and Monitoring**

### **Management Actions**

1. Strive to work with proponents of research and monitoring programs within the aquatic reserve to ensure consistency with the reserve's goals and objectives.

**Meets Objectives 1.1, 1.2, 1.3, 1.4, 2.2, 2.5, 2.6, 4.1, 4.2**

## **D. Environmental Education & Public Access**

### **Management Actions**

1. Partner with various entities to support various environmental -education opportunities for the Protection Island Aquatic Reserve and ensure appropriate access is allowed.

**Meets Objectives 3.1, 3.2, 4.1**

## **E. Commercial and Recreational Fishing**

DNR does not manage commercial or recreational fisheries except for the commercial wildstock Geoduck fishery. Commercial and recreational fisheries within the reserve will continue to be managed by WDFW, responsible tribal governments, and DNR shellfish section staff (wildstock Geoduck, recreational and tribal shellfish only).

## **V. Other Uses**

### **Management Actions**

1. Decline to authorize new cable, pipeline, tidal or wind energy facilities, or any bedland and tideland disturbing activities that are not consistent with the management of the aquatic reserve.

**Meets Objectives 1.1, 1.2, 1.7, 3.5**

2. Authorize new uses, unforeseen or not listed in the management plan, only if the use is consistent with the purpose of the reserve, the goals and objectives, and management actions described in chapters 2, 4, and 5 respectively.

**Meets Objectives 1.1, 1.2, 1.3, 1.4, 1.7, 2.6, 2.7, 3.1, 3.2, 4.2**

3. Project proponents for new uses must clearly demonstrate and document consistency with the purpose of the reserve, the goals and objectives, and the management actions described in chapters 2, 4, and 5 respectively. Aquatic Reserves Program staff, in consultation with region staff will make

---

determinations about the consistency of any proposed uses within the reserve. Determinations will be based on scientific knowledge of the proposed use. If adequate scientific data on a proposed use is not available, DNR may require project proponents to conduct studies addressing such data gaps.

**Meets All Objectives**

---



## 6. Implementation Guidance

The successful management of the Protection Island Aquatic Reserve will require coordination and collaboration with public and private entities as well as local, state, federal, and tribal government, and non-government organizations. Review and evaluation of sound scientific and management information should guide the future development, restoration and protection decisions. To increase collaboration in decision making, DNR will consider forming a permanent Implementation Committee whose purpose would be to guide the implementation of this plan and coordinate decisions that will affect the long-term health of resources and ecosystems of the Protection Island Aquatic Reserve.

This section sets up the methods and time frames for the effective cooperative implementation and successful execution of the management actions of the Protection Island Aquatic Reserves Management Plan. This includes identifying the recruitment qualifications for potential members of the Protection Island Aquatic Reserve Implementation Committee, hereafter referred to as the Implementation Committee, meeting timeframes, and committee decisions.

### I. Protection Island Aquatic Reserve Implementation Committee

The Implementation Committee is charged with the cooperative implementation of the Protection Island Aquatic Reserve Management Plan. This includes, but is not limited to the review of proposals for restoration, enhancement, research, monitoring, within the aquatic reserve; evaluation and recommendation of restoration, research, monitoring, and educational needs; identification of partnerships for management action implementation; evaluation and consideration of potential sources of funding for management action implementation. The Implementation Committee should meet every four months for a total of three times per year. DNR will invite representatives of organizations and individuals to participate on the Implementation Committee through formal invitation letters. The Implementation Committee will have no more than 15 members including representation from the following:

- Clallam and Jefferson County MRC's
- USFWS, Protection Island National Wildlife Refuge
- Local citizen science organization
- Local environmental education organization
- Clallam and Jefferson County government
- Tribal representation



- 
- Puget Sound Partnership
  - Shoreline landowner
  - Washington State Parks
  - WDFW

### **Proposal Evaluation Criteria**

Each restoration, enhancement, research, or monitoring proposal presented to DNR pertaining to the aquatic lands within the Protection Island Aquatic Reserve should be evaluated by the Implementation Committee. The Implementation Committee will evaluate how well each proposal meets the Protection Island Aquatic Reserve Management Plan goals, objectives, and management actions discussed in sections 4 and 5. Each proposal should adhere to the proposal guidelines as described in management actions section 5-V-1 and 5-V-2. In addition to reviewing and evaluating proposals, the Implementation Committee should discuss the merits of different proposals, including, if appropriate, a statement of why a proposal should not be considered for acceptance.

### **Committee Decisions**

While management authority of the Protection Island Aquatic Reserve remains with DNR; DNR will work with the Implementation Committee to develop informed recommendations pertaining to the management of the Protection Island Aquatic Reserve.



---

## 7. Glossary

- Adaptive Management:** Refers to a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management planning. Analysis of results help managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.
- Amphipod:** Any of a large order of small, usually aquatic crustaceans with a laterally compressed body (for example, beach fleas).
- Anadromous:** Migratory fishes that spend most of their lives in the sea and migrate to freshwater to breed.
- Aquaculture:** The culture and/or farming of food fish, shellfish, and other aquatic plants and animals in fresh water, brackish water or salt water areas. Aquaculture practices may include but are not limited to hatching, seeding or planting, cultivating, feeding, raising, harvesting of planted crops or of natural crops so as to maintain an optimum yield, and processing of aquatic plants or animals.
- Aquatic Lands:** For the purposes of this publication, all state-owned tidelands and the bedlands of marine waters. Furthermore, aquatic lands mean all state-owned tidelands, shorelands, harbor areas, and the beds of navigable waters (RCW 79.105.060(1)). Aquatic lands are part of the public lands of the state of Washington and include many public places, waterways, bar islands, avulsively abandoned beds and channels of navigable bodies of water, managed by DNR directly or indirectly through management agreements with other governmental entities.
- Aquatic Reserves Program:** The Aquatic Reserves Program is part of DNR's efforts to promote preservation, restoration, and enhancement of state-owned aquatic lands that provide benefits to the health of native aquatic habitat and species and other resources in the state of Washington. DNR is to establish Aquatic Reserves to protect important native aquatic ecosystems on selected state-owned aquatic lands throughout the state. These are to be aquatic lands of special educational or scientific interest, or lands of special environmental importance (WAC 332-30-151).
- Authorization instrument:** A lease, material purchase, easement, permit, or other document authorizing use of state-owned aquatic lands and/or materials.
- Avulsion:** A sudden and perceptible change in the shoreline of a body of water. Generally no change in boundary lines occurs.
- Beach:** The zone of unconsolidated material that extends landward from the low water line to the place where there is marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of storm waves). The seaward limit of a beach is the extreme low water line. A beach includes a foreshore and a backshore.
- Bedlands or beds of navigable waters:** For the purposes of this publication, those submerged lands lying waterward of the line of extreme low tide in navigable tidal waters.

---

Benthic zone:	The benthic zone is the lowest level of a body of water, such as in an ocean or a lake. It is inhabited by organisms that live in close relationship with (if not physically attached to) the ground, called benthos or benthic organisms.
Benthic:	Refers to organisms associated with the bottom of the sea, lake, or river.
Biological Diversity or biodiversity:	The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. The System's focus is on indigenous species, biotic communities, and ecological processes ("Regional biological diversity" is protected when habitat is provided to species that are becoming locally rare due to loss of habitat).
Biotoxin (marine):	Marine biotoxins are poisons caused by microscopic toxin-producing algae (a type of phytoplankton) that naturally occur in marine waters, normally in amounts too small to be harmful. However, a combination of warm temperatures, sunlight, and nutrient-rich waters can cause rapid plankton reproduction, or "blooms."
Bivalve:	Common term for pelecypods, members of the Mollusca in which the hard parts are composed of 2 sections fitting together to enclose a space that contains the soft part of the organism.
Bluff:	An unvegetated high bank composed largely of unconsolidated deposits with a near-vertical face overlooking a body of water.
Cliff:	A high, very steep to perpendicular or overhanging face of rock rising above the shore.
Coastal zone:	The sea-land fringe area bordering the shoreline where the coastal waters and adjacent lands exert a measurable influence on each other.
Commerce:	The exchange or buying and selling of goods and services. As it applies to aquatic land, commerce usually involves transport and a land/water interface.
Compatible use:	A wildlife-dependent recreational or commercial use or any other use of a reserve that, in the sound professional judgment of DNR, will not materially interfere with or detract from the fulfillment of the goals and objectives or the purpose of the reserve. A compatibility determination, completed by the use proponent, supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.
Critical habitat:	Those areas necessary for the survival of sensitive, threatened, and endangered species, as designated under the Federal Endangered Species Act and Washington State Forest Practices Rules.
Cultural resources:	Archeological and historic sites and artifacts, whether previously recorded or still unrecognized, as administered by Department of Archaeology and Historic Preservation and protected under Title 27 of the Revised Code of Washington.
Demersal:	Organisms living at or near the bottom of a sea or lake but having the capacity for active swimming.
Department of Archaeology and Historic Preservation:	The state agency established to document and protect cultural resources.
Disturbance:	Significant alteration of habitat structure, composition or species behavior. May be natural (e.g. fire) or human-caused events (e.g. aircraft overflight).
Dredging:	The deepening of a river channel, harbor, or other aquatic land by excavating bottom material for recreational, commercial, or environmental purposes.

---

Ecosystem Management:	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.
Ecosystem:	A dynamic and interrelating ecological community consisting of all the living and non-living components of the physical environment.
Educational reserves:	Accessible areas of aquatic lands typical of selected habitat types which are suitable for educational projects.
Endangered Species (Federal):	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species (State):	A plant or animal species in danger of becoming extinct or extirpated in Washington State within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.
Enhance site conditions:	To intentionally re-create elements that existed on site before disturbance, or introduce new functions or characteristics to a site.
Environmental reserves:	Areas of environmental importance, sites established for the continuance of environmental baseline monitoring, and/or areas of historical, geological or biological interest requiring special protective management.
Epibenthic:	Pertaining to the environment and conditions of organisms living near the water bottom.
Extreme low tide:	The line as estimated by the federal government below which it might reasonably be expected that the tide would not ebb. Also considered to be the lowest recorded tidal event over the National Tidal Datum Epoch.
First class tidelands:	The shores of navigable tidal waters belonging to the state lying within or in front of the corporate limits of any city, or within one mile thereof upon either side and between the line of ordinary high tide and the inner harbor line; and within two miles of the corporate limits on either side and between the line of ordinary high tide and the line of extreme low tide (RCW 79.105.060(4)). In general, the line of ordinary high tide is the landward boundary. The line of extreme low tide or the inner harbor line where established, is the waterward boundary. To determine if the tidelands are within two miles of the corporate limits of a city, the distance is measured along the shoreline from the intersection of the corporate limit with the shoreline.
Gastropod:	Any of a large class of mollusks, usually with a univalve shell or no shell and a distinct head bearing sensory organs, such as snails and slugs.
Gill Net:	A type of fishing net utilized by commercial, tribal, and occasionally recreational fishing operations. These nets are the center of much controversy due to the high incidence of by-catch associated with their use.
Goal:	Descriptive, open-ended, and often broad statements of desired future conditions that conveys a purpose but does not define measurable units.
Governmental entity:	Means the federal government, the state, county, city, port district, or other municipal corporations or political subdivision thereof.
Habitat Restoration:	Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.

---

Habitat:	The components of the ecosystem upon which a plant or animal species relies upon for some stage in its life cycle.
Highly Sensitive Areas:	Areas of land and/or water containing features such as fragile soils and vegetation (grassy balds, wetlands), cultural deposits, and habitat for sensitive, threatened, and endangered species, as well as other areas where special management attention is needed to ensure that the legislative mandate to protect such resources is being met.
Intertidal:	The intertidal zone is also known as the foreshore and is that area exposed to the air at low tide and submerged at high tide, for example, the area between tide marks. This area can include many different types of habitats, including steep rocky cliffs, sandy beaches or vast mudflats.
Inventory:	Both a compilation of existing data on human uses, and the biology and geology of aquatic lands as well as the gathering of new information on aquatic lands through field and laboratory analysis. Such data is commonly presented in map form such as the <i>Washington Coastal Atlas</i> .
Island:	A body of land entirely and customarily surrounded by water. Land in navigable waters which is only surrounded by water in times of high water, is not an island within the rule that the state takes title to newly formed islands in navigable waters.
Littoral zone:	Also called the foreshore, or intertidal zone, and is the section of the coast that is periodically covered by high tides and exposed during low tides.
Low-impact public use:	Those "public recreation uses and improvements that do not adversely affect the resource values, are appropriate to the maintenance of the site in a relatively unmodified natural setting, and do not detract from long-term (natural) processes." (RCW 79.71.030)
Maintain site conditions:	To protect natural site characteristics and ecosystem processes, such as wildlife habitat, soil conservation and succession of native plant communities.
Management Actions:	Are derived from both Goals, and more so, specific objectives. A management action is a concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work. Management Actions should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively.
Mean High Water (MHW):	The average height of all the high tidal events reached during the year over a National Tidal Datum Epoch.
Mean Higher High Water (MHHW):	The average of the highest high water events of each tidal day observed over the National Tidal Datum Epoch.
Mean Low Water:	The average of all the low water events observed over the National Tidal Datum Epoch.
Mean Lower Low Water (MLLW):	The average of the lowest low water events of each tidal day observed over the National Tidal Datum Epoch.
Migration:	The seasonal movement from one area to another and back.
Mitigate:	To minimize or compensate for potential adverse environmental impacts.

---

Monitor:	The process of collecting and analyzing data to track changes of selected parameters overtime. A baseline is established and periodic measurements are taken to determine the extent and rate of change over time. Topics include: Beneficial and negative impacts of stewardship activities, natural events and public use.
Moorage facility:	A marina, open water moorage and anchorage area, pier, dock, mooring buoy, or any other similar fixed moorage site.
Mysids:	A group of crustaceans, also known as opossum shrimps that feed upon small zooplankton.
Native Species:	Species that normally live and thrive in a particular ecosystem.
Natural landscape elements:	The natural watercourses, topography, hydrology and vegetation which comprise a particular site.
Natural processes:	Phenomena that shape the landscape's appearance and habitat potential. At Protection Island Aquatic Reserve, natural processes include: littoral drift processes fed by cliff and bluff erosion, relatively free movement of wildlife among a dynamic mosaic of the area's terrestrial and marine habitats, and more.
Nematodes:	Non-segmented roundworms of the phylum Nematoda. They range widely in size and can be free-living or parasitic.
Neritic:	Pertaining to the marine zone between low tides and the edge of the continental shelf, a depth of roughly 200 m. A neritic environment supports marine organisms, also described as neritic, that are capable of surviving in shallow water with moderate exposure to sunlight.
Non-point source discharge:	Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification. Technically, the term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act (see definition of point source).
Objective:	Objectives are derived from goals and provide the basis for determining management strategies. An objective is a target statement of what future conditions will be achieved. For the purposes of this document, objectives should be attainable and stated qualitatively.
Open moorage:	Moorage slips and mooring floats that have completely open sides and tops.
Open water moorage and anchorage areas:	Areas of state-owned aquatic lands leased for moorage and anchorage that do not abut uplands and do not include a built connection to the uplands. May contain mooring buoys, floating moorage docks, other moorage facilities not connected to the shoreline or anchorage areas in accordance with WAC 332-30-139(5).
Ordinary high tide:	The same as mean high tide or the average height of high tide. In Puget Sound, the mean high tide line varies from 10 to 13 ft (3 to 4 m) above the mean lower low water datum.
Ordinary high water:	The line of permanent upland vegetation along the shores of non-tidal navigable waters. In the absence of vegetation, it is the line of mean higher high water.
Pelagic zone:	The pelagic zone is the part of the open sea or ocean and does not include the seafloor.



---

Percent slope:	The direct ratio (multiplied by 100) between the vertical and the horizontal distance for a given slope; e.g., a 3 ft (1 m) rise in a 10 ft (3 m) horizontal distance would be a 30 percent slope.
Photic zone:	The photic zone or euphotic zone is the depth of the water whether in a lake or an ocean that is exposed to sufficient sunlight for photosynthesis to occur. The depth of the euphotic zone can be greatly affected by seasonal turbidity.
Pinniped:	A suborder of carnivores that are marine mammals, have flippers, and eat mostly fish and marine invertebrates (e.g., sea lions, seals).
Point source discharge:	The term "point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture (taken from section 502(14) of the Clean Water Act).
Polychaetes:	Any of a class (Polychaeta) of chiefly marine annelid worms (such as clamworms), usually with paired segmental appendages, separate sexes, and a free-swimming trochophore larva.
Preferred Alternative:	This is the alternative determined [by the decision maker] to best achieve the reserves purpose, vision, and goals, addresses the significant issues, and is consistent with principles of sound aquatic land management.
Priority Species:	Fish and wildlife species that WDFW believe require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.
Public benefit:	Means that all of the citizens of the state may derive a direct benefit from departmental actions in the form of environmental protection; energy and mineral production; utilization of renewable resources; promotion of navigation and commerce by fostering water-dependent uses; and encouraging direct public use and access; and generating revenue in a manner consistent with RCW 79.105.030.
Public lands:	Lands belonging to or held in trust by the state, which are not devoted to or reserved for a particular use by law, and include state lands, tidelands, shorelands and harbor areas as herein defined, and the beds of navigable waters belonging to the state (RCW 79.02.010).
Public tidelands:	Tidelands belonging to and held in public trust by the state for the citizens of the state, which are not devoted to or reserved for a particular use by law.
Public trust:	Certain state-owned tidelands, shorelands and all beds of navigable waters are held in trust by the state for all citizens with each citizen having an equal and undivided interest in the land. The department has the responsibility to manage these lands in the best interest of the general public.
Public use beach:	A state-owned beach available for free public use but which may be leased for other compatible uses.
Public use:	To be made available daily to the general public on a first-come, first-served basis, and may not be leased to private parties on any more than a day use basis.

- 
- Public:** Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in reserve issues and those who do or do not realize that DNR decisions may affect them.
- Rapid shoreline inventory:** A survey of a defined section of shoreline detailing a set of physical and biological data that provides indicators of beach health and a better understanding of shoreline habitat and how it functions.
- Restore site conditions:** To recover natural features and processes that existed on site prior to disturbance.
- Riparian:** Relating to or living or located on the bank of a natural water course, such as a stream, lake or tidewater.
- Runoff:** That part of the precipitation from rain, snowmelt or irrigation that is not absorbed into the ground, instead often flowing over impervious surfaces, or directly into streams and other surface waters or land depressions.
- Saturated:** A condition in which the interstices of a material are filled with a liquid, usually water.
- Scientific reserves:** Sites set aside for scientific research projects and/or areas of unusually rich plant and animal communities suitable for continuing scientific observation.
- Seabird:** A group of birds that obtain at least some food from the ocean by traveling some distance over its surface. They also typically breed on islands and along coastal areas. Seabirds include gulls, alcids, pelicans, albatrosses, storm-petrels, and cormorants, among others.
- Second class tidelands:** The shores of navigable tidal waters belonging to the state, lying outside of and more than two miles from the corporate limits of any city and between the line of ordinary high tide and the line of extreme low tide (RCW 79.105.060(18)). In general, the line of ordinary high tide is the landward boundary. The line of extreme low tide is the waterward boundary. To determine if the tidelands are more than two miles from the corporate limits of a city, the distance is measured along the shoreline from the intersection of the corporate limit with the shoreline.
- Sensitive, threatened, and endangered species:** Plants and animals protected under the federal Endangered Species Act or state designation, with the species level of risk from lower to higher.
- Shore:** That space of land which is alternately covered and left dry by the rising and falling of the water level of a lake, river or tidal area.
- Shoreline:** The intersection of a specified plane of water with beach; it migrates with changes of the tide.
- State Candidate Species:** Defined in WDFW Policy M-6001 to include fish and wildlife species that WDFW will review for possible listing as State Endangered, Threatened, or Sensitive. A species will be considered for designation as a State Candidate if sufficient evidence suggests that its status may meet the listing criteria defined for State Endangered, Threatened, or Sensitive.
- State Endangered Species:** Defined in WAC 232-12-297, Section 2.4, to include "any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state."

---

**State Environmental Policy Act (SEPA):**

The state law that guides a public environmental review process to evaluate potential impacts of a proposed action or plan on the site or area.

**State Sensitive Species:** Defined in WAC 232-12-297, Section 2.6, to include "any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats."

**State Threatened Species:**

Defined in WAC 232-12-297, Section 2.5, to include "any wildlife species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats."

**State-owned aquatic lands:**

Those aquatic lands and waterways administered by DNR or managed under department agreement by a port district. State-owned aquatic lands do not include aquatic lands owned in fee by, or withdrawn for the use of, state agencies other than DNR (RCW 79.105.060(20)).

**Strategy:** A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives

**Subtidal zone:** Also called the sublittoral zone of the coast. The subtidal zone (below low water) is a band that is affected only during the negative tides which occur periodically throughout the year

**Succession:** The natural changes in vegetation and animal life that occur as a plant community recovers from disturbance and proceeds to climax. In forested sites, colonizing plants inhabit bare ground, longer-lived shrubs and trees replace colonizers, and shrub/tree dominance changes with the establishment of a stable and complex system.

**Supralittoral zone:** Also called the splash zone (above high water), this area of the beach or coast remains exposed the longest and whose inhabitants are only sprayed with water, although during episodic "flooding" it is covered by the tide.

**Terminal:** A point of interchange between land and water carriers, such as a pier, wharf, or group of such, equipped with facilities for care and handling of cargo and/or passengers (RCW 79.105.060(21)).

**Threatened Species (Federal):**

Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

**Threatened Species (State):**

A plant or animal species likely to become endangered in Washington State within the near future, if factors contributing to population decline or habitat degradation or loss continue.

**Tidelands:** Marine lands between the lines of ordinary high tide and the line of extreme low tide.

**Uplands:** Lands, including lakes, wetlands and streams, above the line of ordinary high tide.

**Vessel:** A floating structure that is designed primarily for navigation, is normally capable of self propulsion and use as a means of transportation, and meets all

---

applicable laws and regulations pertaining to navigation and safety equipment on vessels, including, but not limited to, registration as a vessel by an appropriate government agency.

Water-dependent use: A use which cannot logically exist in any location but on the water. Examples include, but are not limited to, waterborne commerce; terminal and transfer facilities; ferry terminals; watercraft sales in conjunction with other water dependent uses; watercraft construction, repair, and maintenance; moorage and launching facilities; aquaculture; log booming; and public fishing piers and parks (RCW 79.105.060(24)).

---



## 8. Reference Literature

- Booth, Derek B. "Glaciofluvial infilling and scour of the Puget Lowland, Washington, during ice-sheet glaciation." *Geology* 22 (1994): 695-698.
- Chu, Y.H. "Beach erosion and protection: a case study at Lincoln Park, Seattle." *Shore and Beach* 53, no. 3 (1985): 26-32.
- Clallam County Shoreline Advisory Committee. "Shoreline Management and Shoreline Master Program Update." *Clallam County, Washington*. June 16, 1992.  
[http://www.clallam.net/realestate/assets/applets/SHORELINE\\_MASTER\\_PROGRAM.pdf](http://www.clallam.net/realestate/assets/applets/SHORELINE_MASTER_PROGRAM.pdf) (accessed March 01, 2010).
- Collias, E. E., N. McGary, and C. A. Barnes. *Atlas of physical and chemical properties of Puget Sound and its approaches*. Seattle, WA: University of Washington Press, 1974.
- Davies, J.L. "A Morphogenic Approach to World Shorelines." *Zeitschrift fur Geomorphology* 8 (1964): 127-142.
- Downing, John. *The coast of puget sound: its processes and development*. Seattle: Washington Sea Grant, 1983.
- Drewitt, A. L., R. H. W. Langston. "Assessing the impacts of wind farms on birds." *Ibis*, 148, 2006, 29-42.
- ESA Adolfson. "Shoreline Inventory and Analysis." *Jefferson County Department of Community Development*. 12 23, 2008.  
[http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/Inventory/FSICR\\_Nov\\_2008/Nov\\_2008\\_Final\\_ICR\\_Ch3Ecosystem.pdf](http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/Inventory/FSICR_Nov_2008/Nov_2008_Final_ICR_Ch3Ecosystem.pdf) (accessed 02 10, 2010).
- Gustafson, R.G., et al. *Status Review of Pacific Hake, Pacific Cod, and Walleye Pollock from Puget Sound, Washington*. NOAA Tech. Memo. NMFS-NWFSC-44, 275 p. , Washington D.C.: Dept. Commer., 2000.
- Harrison, P. J., D. L. Mackas, B. W. Frost, R. W. Macdonald, and E. A. Crecelius. "An assessment of nutrients, plankton, and some pollutants in the water column of Juan de Fuca Strait, Strait of Georgia and Puget Sound, and their transboundary transport." *Can. Tech. Rep. Fish. Aquat. Sci.* 1948, 1994, 138-172.
- Jefferson County Department of Community Development. "Shoreline Inventory and Analysis." *Jefferson county Department of Community Development*. 12 23, 2008.  
[http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/Inventory\\_8-2-05.pdf](http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/Inventory_8-2-05.pdf) (accessed 02 16, 2010).

- 
- . "Shoreline Program Update 2005-2009." *Jefferson County Department of Community Development*. December 9, 2009.  
[http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/PDSMP/PDSMP\\_Dec\\_3\\_08\\_Full%20Doc\\_FINAL.pdf](http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/PDSMP/PDSMP_Dec_3_08_Full%20Doc_FINAL.pdf) (accessed February 9, 2010).
- Johannessen. "Net-shore drift of San Juan County and parts of Jefferson, Island and Snohomish Counties, Washington." Bellingham: MS Thesis: Western Washington University, 1993. 175.
- Johannessen, and MacLennan. *Beaches and Bluffs of Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-04, Seattle, Washington: Seattle District, U.S. Army Corps of Engineers, 2007, 34.
- Khangaonkar, T., et al. "PNNL's High Resolution 3-D Unstructured Circulation & Transport Model of Puget Sound." *Marine Sciences Laboratory Water Resources Modeling Group*. Seattle: Pacific Northwest National Laboratory, 2007.
- Komar. *Beach Processes and Sedimentation*. Upper Saddle River: Prentice Hall, 1998.
- . *The Pacific Northwest Coast: Living with the Shores of Oregon and Washington*. Durham: Duke University Press, 1998.
- Mote, P., A. Petersen, S. Reeder, H. Shipman, and L.W. Binder. *Sea Level Rise in the Coastal Waters of Washington State*. Seattle: University of Washington Climate Impacts Group, 2008.
- National Data Buoy Center. *NDBC Station 46088 Historical Data*. February 10, 2009. [http://www.ndbc.noaa.gov/station\\_history.php?station=46088](http://www.ndbc.noaa.gov/station_history.php?station=46088) (accessed April 14, 2009).
- National Oceanic and Atmospheric Administration. *Data Retrieval*. November 23, 2005.  
[http://tidesandcurrents.noaa.gov/data\\_menu.shtml?unit=0&format=Apply+Change&stn=9444900+Port+Townsend%2C+WA&type=Datums](http://tidesandcurrents.noaa.gov/data_menu.shtml?unit=0&format=Apply+Change&stn=9444900+Port+Townsend%2C+WA&type=Datums) (accessed January 6, 2010).
- Nightingale, Barbara. *Summary Report: Literature and Data Search on the Status of Marine Resources in Jefferson County*. Port Townsend, WA: Jefferson County Marine Resources Committee, 2000.
- Polagye, B., Kawase, M., and Malte, P. 2009. In-stream tidal energy potential of Puget Sound, Washington, Proc. Inst. MechE, Part A: J. Power and Energy, 223(5).
- Sewell, A. *Kelp bed mapping in Washington: Preliminary results*. Puget Sound Water Quality Action Team's Sound Waves 14, No. 2: 1-3, 1999.
- The Weather Channel Interactive, Inc. *Monthly Averages for Sequim, Wa - weather.com*. February 10, 2010.  
<http://www.weather.com/outlook/health/achesandpains/wxclimatology/monthly/USWA0401> (accessed February 10, 2010).
- Thomson, R.E. "Physical oceanography of the Strait of Georgia-Puget Sound-Juan de Fuca Strait System." Edited by R. C. H. Wilson, R. J. Beamish, F. Aitkens

---

and J. Bell, Review of the marine environment and biota of Strait of Georgia, Puget Sound and Juan de Fuca Strait . *BC/Washington Symposium on the Marine Environment, January 13 & 14, 1994*. Can. Tech. Rep. Fish. Aquat. Sci. 1948, 1994. 36-98.

US Fish and Wildlife Service. *Protection Island National Wildlife Refuge*. 2010. <http://www.fws.gov/refuges/profiles/index.cfm?id=13533> (accessed February 16, 2010).

VENUS. "Summary of May 12 Juan de Fuca Workshop." *VENUS - Victoria Experimental Network Under the Sea - University of Victoria*. May 12, 2004. <http://venus.uvic.ca/documents/JdFMay12Summary.pdf> (accessed January 6, 2010).

Washington Department of Fish and Wildlife. "Invasive Tunicate Species Management Program." *Washington Department of Fish and Wildlife Aquatic Nuisance Species*. June 2009. [http://wdfw.wa.gov/fish/ans/tunicates\\_bienniumreport2007-09.pdf](http://wdfw.wa.gov/fish/ans/tunicates_bienniumreport2007-09.pdf) (accessed February 19, 2010).

Washington Shorezone Inventory. "DNR GIS Data." *Washington State Department of Natural Resources*. 2001. <http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html> (accessed April 1, 2010).

Washington State Department of Agriculture. "Spartina Eradication." *Washington State Department of Agriculture*. 2010. <http://agr.wa.gov/PlantsInsects/Weeds/Spartina/docs/LegReport2007.pdf> (accessed April 1, 2010).

Washington State Department of Ecology. "Net Shore-Drift in Washington State." *GIS at the Washington State Department of Ecology*. June 1991. [ftp://www.ecy.wa.gov/gis\\_a/shore/driftcells.zip](ftp://www.ecy.wa.gov/gis_a/shore/driftcells.zip) (accessed 02 16, 2010).



---



## Appendix A – Observed Species Lists

The following lists are the various species of flora and fauna that have been identified by various organizations and individuals to use the area in and around the Protection Island Aquatic Reserve.

The following lists also identify the status of any species on the Washington State and Federal Sensitive, Threatened or Endangered Species lists. Species of Concern in Washington include those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate, as well as species listed or proposed for listing by the USFWS or the National Marine Fisheries Service. For the purposes of this document, species of federal concern under the U.S. Endangered Species Act include those species listed as Federal Endangered, Federal Threatened, Federal Candidate, and Federal Concern.

The following species lists identify: Birds, Fish, Invertebrates, Marine mammals and Marine vegetation.

### **Birds**

There are 76 bird species that have been identified to use the area in and around the Protection Island Aquatic Reserve. Protection Island is an important bird breeding area in Puget Sound. It is an important nesting site for Glaucous-winged Gulls, Double-crested Cormorant, Rhinoceros Auklets, Black Oystercatchers, and Tufted Puffins (USFWS, 1989). Protection Island is one of only two areas in Puget Sound where Rhinoceros Auklets are concentrated. More than 95% of the North American population of Rhinoceros Auklets occurs in Washington, British Columbia, and southeast Alaska.

In 2008, Pearson et al found that Protection Island is the third largest breeding colony in North America. The concentration of such a large portion of North American Rhinoceros Auklet population on Protection Island means this area has significant implications to the species as a whole (Scott Pearson, 2009). In 2007, PSAMP reported breeding pairs in the area had declined 30 percent between 1975 and 2000 (PSAMP, 2007). This is also the only area in Puget Sound where Tufted Puffin nests have not been reduced from historical levels (Scott Pearson, WDFW, pers. com).

The shallow waters at Dallas Bank, north of Protection Island, are important for diving ducks like scoters, Long-tailed Ducks, Harlequin Ducks, etc. Most of these species go to the bottom to capture clams, mussels, crabs, and other invertebrates. Large numbers of these species consistently gather around the bank during fall, winter, and spring. Other species like cormorants and alcids also go to the bottom if

necessary, particularly Pelagic Cormorants and Pigeon Guillemots. Part of the bank is soft bottom and part is rocky bottom, which promotes a diversity of diving birds.

Some of the largest concentrations of Ancient Murrelets, Long-tailed Ducks, and Pacific Loons found in Washington State may occur in the area during late fall and early winter. Thousands of Common Murres, many of which nest in Oregon and California, gather in the eastern strait from late summer through mid-winter, including the areas of the aquatic reserve. Red-necked Grebes have also begun to outnumber Horned and Western Grebes in recent years. Also, the Audubon's regional "Christmas bird count" leads the United States, and often all of North America, in numbers of Pigeon Guillemots and Ancient Murrelets, many of which are in the aquatic reserve area. (Bob Boekelheide, pers comm. 2010)

Common Name	Scientific Name	State Status	Federal Status	Notes
Western Grebe	<i>Aechmophorus occidentalis</i>	Candidate	None	2, 6
Northern Pintail	<i>Anas acuta</i>			2, 6
American Wigeon	<i>Anas americana</i>			2, 6
Green-winged Teal	<i>Anas crecca</i>			2
Mallard Duck	<i>Anas platyrhynchos</i>			2, 6
Great Blue Heron	<i>Ardea herodias</i>			8
Ruddy Turnstone	<i>Arenaria interpres</i>			8
Black Turnstone	<i>Arenaria melanocephala</i>			2
Greater Scaup	<i>Aythya marila</i>			2, 6
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Threatened	Threatened	2, 6
Brant	<i>Branta bernicla</i>			2, 6
Canada Goose	<i>Branta canadensis</i>			8
Bufflehead	<i>Bucephala albeola</i>			2, 6
Common Goldeneye	<i>Bucephala clangula</i>			2, 6
Barrow's Goldeneye	<i>Bucephala islandica</i>			2, 6
Sanderling	<i>Calidris alba</i>			8
Dunlin	<i>Calidris alpina</i>			8
Western Sandpiper	<i>Calidris mauri</i>			8
Pigeon Guillemot	<i>Cepphus columba</i>			2, 6
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>			2, 6
Semi-palmated Plover	<i>Charadrius semipalmatus</i>			8
Killdeer	<i>Charadrius vociferus</i>			8
Black Tern	<i>Chlidonias niger</i>			2

Long-tailed Duck	<i>Clangula hyemalis</i>			2, 6
American Crow	<i>Corvus brachyrhynchos</i>			8
Peregrine Falcon	<i>Falco peregrinus</i>	Sensitive	Concern	8
Tufted Puffin	<i>Fratercula cirrhata</i>	Candidate	Concern	2
Northern Fulmar	<i>Fulmarus glacialis</i>			6
Yellow-billed Loon	<i>Gavia adamsii</i>			2, 6
Common Loon	<i>Gavia immer</i>	Sensitive	None	2, 6
Pacific Loon	<i>Gavia pacifica</i>			2, 6
Red-throated Loon	<i>Gavia stellata</i>			2, 6
Black Oystercatcher	<i>Haematopus bachmani</i>			2
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Concern	2, 6
Harlequin Duck	<i>Histrionicus histrionicus</i>			2, 6
Herring Gull	<i>Larus argentatus</i>			2, 6
California Gull	<i>Larus californicus</i>			2, 6
Mew Gull	<i>Larus canus</i>			2, 6
Ring-billed Gull	<i>Larus delawarensis</i>			2, 6
Glaucous-winged Gull	<i>Larus glaucescens</i>			2, 6
Glaucous-winged x Western Gull (hybrid)	<i>Larus glaucescens x occidentalis</i>			2,6
Heermann's Gull	<i>Larus heermanni</i>			2
Glaucous Gull	<i>Larus hyperboreus</i>			8
Western Gull	<i>Larus occidentalis</i>			2, 6
Bonaparte's Gull	<i>Larus philadelphia</i>			8
Thayer's Gull	<i>Larus thayeri</i>			2, 6
Marbled Godwit	<i>Limosa fedoa</i>			8
Hooded Merganser	<i>Lophodytes cucullatus</i>			8
Belted Kingfisher	<i>Megaceryle alcyon</i>			8
White-winged Scoter	<i>Melanitta fusca</i>			2, 6
Black Scoter	<i>Melanitta nigra</i>			2, 6
Surf Scoter	<i>Melanitta perspicillata</i>			2, 6
Common Merganser	<i>Mergus merganser</i>			2, 6
Red breasted Merganser	<i>Mergus serrator</i>			2, 6
Whimbrel	<i>Numenius phaeopus</i>			8
Osprey	<i>Pandion haliaetus</i>			8
Brown Pelican	<i>Pelecanus occidentalis</i>	Endangered	None	2

Cliff Swallow	<i>Petrochelidon pyrrhonota</i>			8
Double-crested Cormorant	<i>Phalacrocorax auritus</i>			2, 6
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>			2, 6
Brandt's Cormorant	<i>Phalacrocorax penicillatus</i>	Candidate	None	2, 6
Red-necked Phalarope	<i>Phalaropus lobatus</i>			8
Black-bellied Plover	<i>Pluvialis squatarola</i>			8
Horned Grebe	<i>Podiceps auritus</i>			2, 6
Red-necked Grebe	<i>Podiceps grisegena</i>			2, 6
Eared Grebe	<i>Podiceps nigricollis</i>			2, 6
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>			6
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>			8
Parasitic Jaeger	<i>Stercorarius parasiticus</i>			8
Caspian Tern	<i>Sterna caspia</i>			2
Common Tern	<i>Sterna hirundo</i>			8
Ancient Murrelet	<i>Synthliboramphus antiquus</i>			2, 6
Violet-green Swallow	<i>Tachycineta thalassina</i>			8
Greater Yellowlegs	<i>Tringa melanoleuca</i>			8
Common Murre	<i>Uria aalge</i>	Candidate	None	2, 6
Thick-billed Murre	<i>Uria lomvia</i>			6

## Fish

There are 90 fish species that have been identified to use the area in and around the Protection Island Aquatic Reserve. The area within the reserve is rich with aquatic vegetation that fish rely on during various life stages. Those fish in turn are important food sources for other animals that frequent the aquatic reserve.

Large concentrations of forage fish are used by birds in the eastern Strait and the aquatic reserve as a primary food source. Historically, WDFW data for herring abundance showed that local waters, particularly Discovery Bay, were important spawning locations just 20-30 years ago, but unfortunately no longer. Healthy stocks of forage fish like herring, sandlance, and smelt are an important food source for populations of piscivorous birds in the area, such as Rhinoceros Auklets, other alcids, Pacific Loons, cormorants, and gulls. In productive years, bird feeding flocks can be seen daily throughout the aquatic reserve going after forage fish.

Common Name	Scientific Name	State Status	Federal Status	Notes
Northern Spearnose Poacher	<i>Agonopsis emmelane</i>			2
Sturgeon Poacher	<i>Agonus acipenserinus</i>			2
American Shad	<i>Alosa sapidissima</i>			1
Pacific Sand Lance	<i>Ammodytes hexapterus</i>			1
Smooth Alligatorfish	<i>Anoplagonus inermis</i>			2
Sablefish	<i>Anoplopoma fimbria</i>			2
Pinpoint Gunnel	<i>Apodichthys flavidus</i>			1
Padded Sculpin	<i>Artedius fenestralis</i>			2
Arrowtooth Flounder	<i>Atheresthes stomias</i>			2
Tube Snout	<i>Aulorhynchus flavidu</i>			1
Silver Spot Sculpin	<i>blepsias cirrhosus</i>			1
Roughback Sculpin	<i>Chitonotus pugetensis</i>			2
Pacific Sanddab	<i>Citharichthys sordidus</i>			1, 2
Sanddab Uniden.	<i>Citharichthys spp.</i>			2
Speckled Sanddab	<i>Citharichthys stigmaeus</i>			2
Sharpnose Sculpin	<i>Clinocottus acuticeps</i>			1
Pacific Herring	<i>Clupea harengus pallasi</i>	Candidate	Concern	1, 2
Snailfish Uniden.	<i>Cyclopteridae (Liparidinae) spp.</i>			2
Shiner Perch	<i>Cymatogaster aggregata</i>			1, 2
Spinyhead Sculpin	<i>Dasycottus setiger</i>			2
Striped Perch	<i>Embiotoca lateralis</i>			1
Striped Seaperch	<i>Embiotoca lateralis</i>			2
Northern Anchovy	<i>Engraulis mordax</i>			1, 2
Buffalo Sculpin	<i>Enophrys bison</i>			1
Pacific Spiny Lumpsucker	<i>Eumicrotremus orbis</i>			2
Pacific Cod	<i>Gadus macrocephalus</i>	Candidate	Concern	1, 2
Threespine Stickleback	<i>Gasterosteus aculeatus</i>			1
Rex Sole	<i>Glyptocephalus zachirus</i>			2
Northern Clingfish	<i>Gobiesox maeandricus</i>			1
Kelp Greenling	<i>Hexagrammos decagrammus</i>			1, 2
Whitespotted Greenling	<i>Hexagrammos stelleri</i>			1, 2
Flathead Sole	<i>Hippoglossoides</i>			2

<i>elassodon</i>				
Pacific Halibut	<i>Hippoglossus stenolepis</i>			7
Spotted Ratfish	<i>Hydrolagus colliei</i>			2
Surf Smelt	<i>Hypomesus pretiosus</i>			1
Northern Sculpin	<i>Icelinus borealis</i>			2
Southern Rock Sole	<i>Lepidopsetta bilineata</i>			2
Northern Rock Sole	<i>Lepidopsetta polyxystra</i>			2
Rock Sole	<i>Lepidopsetta spp.</i>			1, 2
Pacific Staghorn Sculpin	<i>Leptocottus armatus</i>			2
Staghorn Sculpin	<i>Leptocottus armatus</i>			2
Marbled Snailfish	<i>Liparis dennyi</i>			2
Showy Snailfish	<i>Liparis pulchellus</i>			2
Snake Prickleback	<i>Lumpenus sagitta</i>			1, 2
Blackbelly Eelpout	<i>Lycodes pacificus</i>			2
Wattled Eelpout	<i>Lycodes palearis</i>			2
Slender Sole	<i>Lyopsetta exilis</i>			2
Soft Sculpin	<i>Malacocottus zonurus</i>			1
Pacific Whiting (Hake)	<i>Merluccius productus</i>	Candidate	Concern	2
Pacific Tomcod	<i>Microgadus proximus</i>			1, 2
Great Sculpin	<i>Myoxocephalus polyacanthocephalu</i>			1, 2
Sailfin Sculpin	<i>Nautichthys oculofasciatus</i>			1
Tidepool Sculpin	<i>Oligocottus maculosus</i>			1
Cutthroat trout	<i>Oncorhynchus clarkii</i>			1
Pink Salmon	<i>Oncorhynchus gorbuscha</i>			1
Chum Salmon	<i>Oncorhynchus keta</i>	Candidate	Threatened	1
Coho Salmon	<i>Oncorhynchus kisutch</i>			1
Steelhead Trout	<i>Oncorhynchus mykiss</i>			1
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Candidate	Threatened	1
Lingcod	<i>Ophiodon elongatus</i>			1
English Sole	<i>Parophrys vetulus</i>			1, 2
Sand Sole	<i>Pegusa lascaris</i>			1
Crescent Gunnel	<i>Pholis laeta</i>			1
Saddleback Gunnel	<i>Pholis ornata</i>			1
Red Gunnel	<i>Pholis schultzi</i>			1
Starry Flounder	<i>Platichthys stellatus</i>			1, 2
Curlfin Sole	<i>Pleuronichthys</i>			2

	<i>decurrens</i>			
Plainfin Midshipman	<i>Porichthys notatus</i>			2
Whitebarred Prickleback	<i>Poroclinus rothrocki</i>			2
Tadpole Sculpin	<i>Psychrolutes paradoxus</i>			1
Slim Sculpin	<i>Radulinus asprellus</i>			2
Big Skate	<i>Raja binoculata</i>			2
Sandpaper Skate	<i>Raja kincaidi</i>			2
Longnose Skate	<i>Raja rhina</i>			2
Pile Perch	<i>Rhacochilus vacca</i>			1, 2
Grunt Sculpin	<i>Rhamphocottus richardsoni</i>			2
Puget Sound Sculpin	<i>Ruscarius meanyi</i>			1
Quillback Rockfish	<i>Sebastes maliger</i>			2
Vermilion Rockfish	<i>Sebastes miniatus</i>			2
Redstripe Rockfish	<i>Sebastes proriger</i>	Candidate	None	2
Dover Sole	<i>Solea solea</i>			2
Spiny Dogfish	<i>Squalus acanthias</i>			2
Bay Pipefish	<i>Syngnathus leptorhynchus</i>			1
Eulachon	<i>Thaleichthys pacificus</i>	Candidate	None	2
Walleye Pollock	<i>Theragra chalcogramma</i>	Candidate	Concern	1, 2
Pacific Sandfish	<i>Trichodon trichodon</i>			1
Ribbed Sculpin	<i>Triglops pingeli</i>			2
Longspine Combfish	<i>Zaniolepis latipinnis</i>			2
Eelpout Uniden.				2
Sculpin Uniden.				2

### Invertebrates

There are 80 invertebrate species that have been identified within the Protection Island Aquatic Reserve.

Common Name	Scientific Name	State Status	Federal Status	Notes
Sea Mouse	<i>Aeolidia papillosa</i>			2
Aggregating Anemone	<i>Anthopleura elegantissima</i>			5
Smooth Acorn	<i>Balanus crenatus</i>			5



Barnacle		
Acorn Barnacle	<i>Balanus glandula</i>	5
Dungeness Crab	<i>Cancer magister</i>	2
Pygmy Rock Crabs	<i>Cancer oregonensis</i>	2
Red Rock Crab	<i>Cancer productus</i>	2
Broad Snow Crab	<i>Chionoecetes opilio</i>	2
Pink Scallop (Smooth)	<i>Chlamys rubida</i>	2
Longhorned Decorator Crab	<i>Chorilia longipes</i>	2
Crangonid Shrimp Uniden.	<i>Crangon sp.</i>	2
Slippersnail Uniden.	<i>Crepidula sp.</i>	2
Rose Sea Star	<i>Crossaster papposus</i>	2
Gumboot Chiton	<i>Cryptochiton stelleri</i>	2
Brown Barnacles	<i>Cthamalus dalli</i>	5
Small brown barnacle	<i>Cthamalus dalli</i>	5
Sea Cucumbers	<i>Cucumaria miniata</i>	2
Lion's Mane Jelly	<i>Cyanea capillata</i>	2
Leather Star	<i>Dermasterias imbricata</i>	2
Brooding Anemone	<i>Epiactis sp.</i>	5
Feather Duster	<i>Eudistylia sp.</i>	2
Moon Snail	<i>Euspira lewisii</i>	2
False Ochre Star	<i>Evasterias troschelii</i>	2
Long Armed Spiny Seastar	<i>Evasterias troschelii</i>	2
Pill Bug Isopod	<i>Gnorimosphaeroa oregonensis</i>	2
Basket Star	<i>Gorgonocephalus eucnemis</i>	2
Stalked Jelly	<i>Haliclystus stejnegeri</i>	2
Purple Shore Crab	<i>Hemigrapsus nudus</i>	5
Hairy Shore Crab	<i>Hemigrapsus oregonensis</i>	5
Blood Star	<i>Henricia leviuscula</i>	2
North Pacific Toad Crab	<i>Hyas lyratus</i>	2
Rockweed Isopod	<i>Idotea wosnesenskii</i>	2
Eelgrass Snail	<i>Lacuna sp.</i>	5
Spiny Lebbeid	<i>Lebbeus groenlandicus</i>	2
Six-rayed Star	<i>Leptasterias hexactis</i>	2

Checked Periwinkle	<i>Littorina scutulata</i>	5
Sitka Periwinkle	<i>Littorina sitkana</i>	2
California Market Squid	<i>Loligo opalescens</i>	2
Black-clawed Crab	<i>Lophopanopeus bellus</i>	5
Shield Limpet	<i>Lottia pelta</i>	2
Vermillion Star	<i>Mediaster aequalis</i>	2
White Plumed Anemone	<i>Metridium senile</i>	2
Northern Horse Mussel	<i>Modiolus modiolus</i>	2
Mossy Chiton	<i>Mopalia muscosa</i>	2
Sand Worm	<i>Nephtys</i> sp.	2
Friiled Dogwinkle	<i>Nucella lamellosa</i>	5
Little Red Octopus	<i>Octopus rubescens</i>	2
Decorator Crab	<i>Oregonia gracilis</i>	2
Hairy Hermit Crab	<i>Pagurus hirsutiusculus</i>	2
Steven's Hermit	<i>Pagurus stevensae</i>	2
Sidestriped Shrimp	<i>Pandalopsis dispar</i>	2
Dock Shrimp	<i>Pandalus danae</i>	2
Alaskan Pink Shrimp	<i>Pandalus eous</i>	5
Humpy Shrimp	<i>Pandalus goniurus</i>	2
Coonstriped Shrimp	<i>Pandalus hypsinotus</i>	2
Ocean Pink Shrimp	<i>Pandalus jordani</i>	2
Spotted Prawn	<i>Pandalus platyceros</i>	2
Horned Shrimp	<i>Paracrangon echinata</i>	2
Porcelain Crab	<i>Petrolisthes</i> sp.	2
Pink Short Spined Seastar	<i>Pisaster brevispinous</i>	2
Native Littleneck clam	<i>Protothaca staminea</i>	5
Graceful Kelp Crab	<i>Pugettia gracilis</i>	2
Kelp Crabs	<i>Pugettia producta</i>	2
Cryptic Kelp Crab	<i>Pugettia richii</i>	2
Sunflower Star	<i>Pycnopodia helianthoides</i>	2
Warty Sea Squirt	<i>Pyura haustor</i>	2
Stubby Squid	<i>Rossia pacifica</i>	2
Butter Clam	<i>Saxidomus gigantea</i>	2
Thatched Barnacle	<i>Semibalanus cariosus</i>	2
Thatched barnacle	<i>Semibalanus cariosus</i>	5

Calcareous Tube Worm	<i>Serpula</i> sp.	5
Green Sea Urchin	<i>Strongylocentrotus droebachiensis</i>	2
Red Sea Urchin	<i>Strongylocentrotus franciscanus</i>	2
Purple Sea Urchin	<i>Strongylocentrotus purpuratus</i>	2
Fish-Eating Seastar	<i>Stylasterias forreri</i>	2
Mask Limpet	<i>Tectura personna</i>	2
Plate Limpet	<i>Tectura scutum</i>	2
Orange-spotted Nudibranch	<i>Triopha catalinae</i>	2
Manila clam	<i>Venerupis philippinarum</i>	5
Rough Piddock	<i>Zirfaea pilsbryi</i>	2

### Marine Mammals

There are 10 marine mammal species that have been identified to use the area in and around the Protection Island Aquatic Reserve.

Common Name	Scientific Name	State Status	Federal Status	Notes
Northern Minke whale	<i>Balaenoptera acutorostrata</i>			2, 3, 4
Gray Whale	<i>Eschrichtius robustus</i>	Sensitive	None	2, 3, 4
Steller Sea Lion	<i>Eumetopias jubatus</i>	Threatened	Threatened	2, 3, 4
White-sided Dolphin	<i>Lagenorhynchus obliquidens</i>			2, 3, 4
Northern Elephant Seal	<i>Mirounga angustirostris</i>			2, 3, 4
Killer Whale	<i>Orcinus orca</i>	Endangered	Endangered	2, 3, 4
Harbor Seal	<i>Phoca vitulina</i>			2, 3, 4
Pacific Harbor Porpoise	<i>Phocoena phocoena</i>	Candidate	None	2, 3, 4
Dall's Porpoise	<i>Phocoenoides dalli</i>			2, 3, 4
California Sea Lion	<i>Zalophus californianus</i>			2, 3, 4

### Marine Vegetation

There are 40 species of marine vegetation that have been identified within the Protection Island Aquatic Reserve.

Common Name	Scientific Name	State Status	Federal	Notes
-------------	-----------------	--------------	---------	-------

		<b>Status</b>
Green Rope	<i>Acrosiphonia</i> sp.	5
Sea Collander	<i>Agarum fimbriatum</i>	5
Winged kelp	<i>Alaria marginata</i>	5
Fir Needle	<i>Analipus japonica</i>	5
Turkish Towel Seaweed	<i>Chondracanthus exasperatus</i>	5
Seersucker Kelp	<i>Costaria costata</i>	5
Triple-rib Kelp	<i>Cymanthere triplicata</i>	5
Flattened Acid Kelp	<i>Desmarestia ligulata</i>	5
Stringy Acid Kelp	<i>Desmarestia viridus</i>	5
Feather Boa kelp	<i>Egregia menziesii</i>	5
Green Ribbon	<i>Enteromorpha</i> spp.	5
Rockweed	<i>Fucus gardneri</i>	5
Veined Blade	<i>Hymenena</i> sp.	5
Split-blade Kelp	<i>Laminaria bongardiana</i>	5
Sea Cauliflower	<i>Leathesia difformis</i>	5
Turkish Washcloth	<i>Mastocarpus papillatus</i>	5
Black Tar Spot	<i>Mastocarpus petrocelis</i>	5
Splendid Iridescent Seaweed	<i>Mazzealla splendens</i>	5
Black Pine	<i>Neorhodomela larix</i>	5
Bull Kelp	<i>Nereocystis leutkeana</i>	5
Sea Brush	<i>Odonthalia floccosa</i>	5
Flat Sea Brush	<i>Odonthalia washingtoniensis</i>	5
Sea Laurel	<i>Osmundia spectabilis</i>	5
Toothed Surfgrass	<i>Phyllospadix serrulatus</i>	5
Surf Grass	<i>Phyllospadix serrulatus</i>	5
Sea Spatula	<i>Pleurophycus gardenerii</i>	5
Sea Comb	<i>Plocamium cartilagineum</i>	5
Red Nori	<i>Porphyra nereocystis</i>	5
Brown Cellophane	<i>Porphyra</i> sp.	5
*Genus	<i>Porphyra</i> spp.	5
Bleachweed	<i>Prionitis</i> sp.	5

---

Woody-stemmed Kelp	<i>Pterygophora californica</i>	5
Sugar Kelp	<i>Saccharina latissium</i>	5
Sea Cabbage	<i>Saccharina sessile</i>	5
Southern Stiff-stiped Kelp	<i>Saccharina setchellii</i>	5
Red String Seaweed	<i>Sarcodiotheca gaudichaudii</i>	5
Wireweed	<i>Sargassum muticum</i>	5
Red Eyelet Silk	<i>Sparlingia pertusa</i>	5
Sea Lettuce	<i>Ulva</i> spp.	5
Eel Grass	<i>Zostera marina</i>	5

---

Notes (Data Sources):

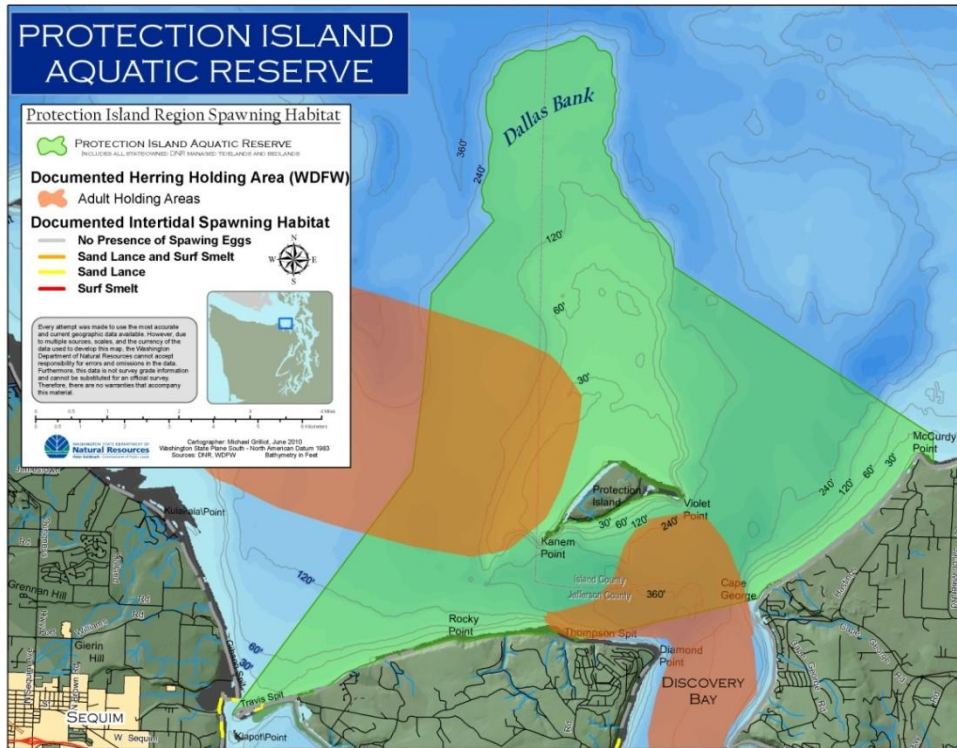
- 1 - NOAA Seining (Kurt Fresh)
- 2 - Washington Department of Fish and Wildlife
- 3 - Cascadia Research
- 4 - Orca Network
- 5 - Department of Natural Resources
- 6 - Olympic Peninsula Audubon Society and the Dungeness River Audubon Center
- 7 - Puget Sound Anglers
- 8 - Dungeness River Audubon Center

\* The Quimper and Miller Peninsulas were partially surveyed for surf smelt and Pacific sand lance. The western portion of Travis Spit has a documented sand lance spawning beach. Although there appears to be suitable upper intertidal surf smelt spawning substrate along portions of the outer beach of the Miller Peninsula, this area has not been documented as surf smelt spawning Habitat. The western portion of the reserve area has a significant pre-spawn herring holding grounds for the Discovery Bay herring stock. Protection Island has not been surveyed for either surf smelt or sand lance spawning areas.

# Appendix B – Maps

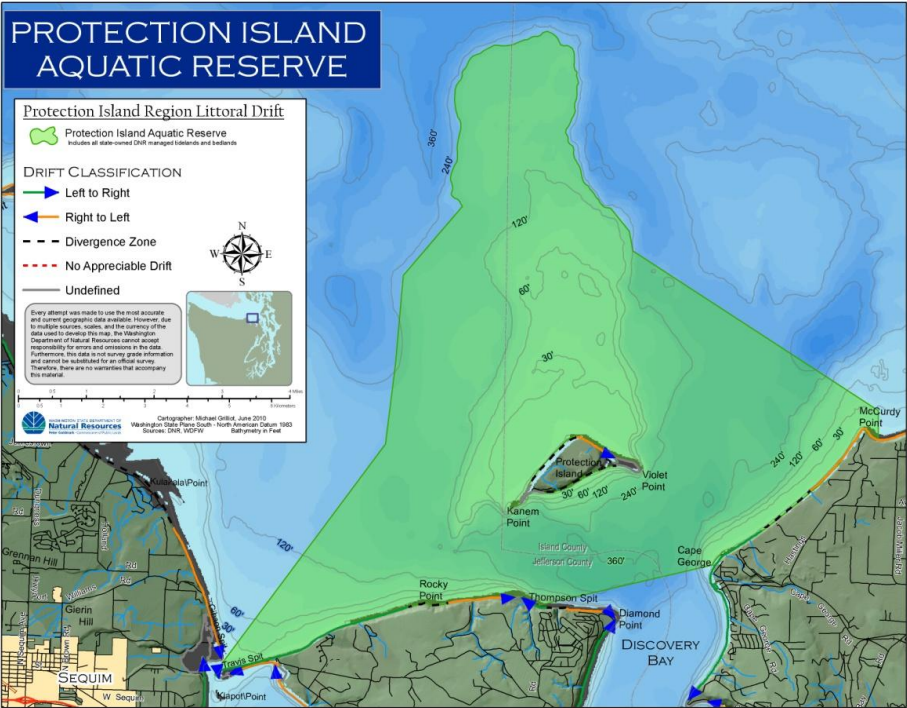
The following maps were created to better inform the development of the Protection Island Aquatic Reserve Management Plan by identifying the species and habitat and environments that exist in and around and use the Protection Island Aquatic Reserve.

Figure 1 – Spawning Habitat





**Figure 2 – Littoral Drift Classification**



**Figure 3 – Floating Kelp Distribution**

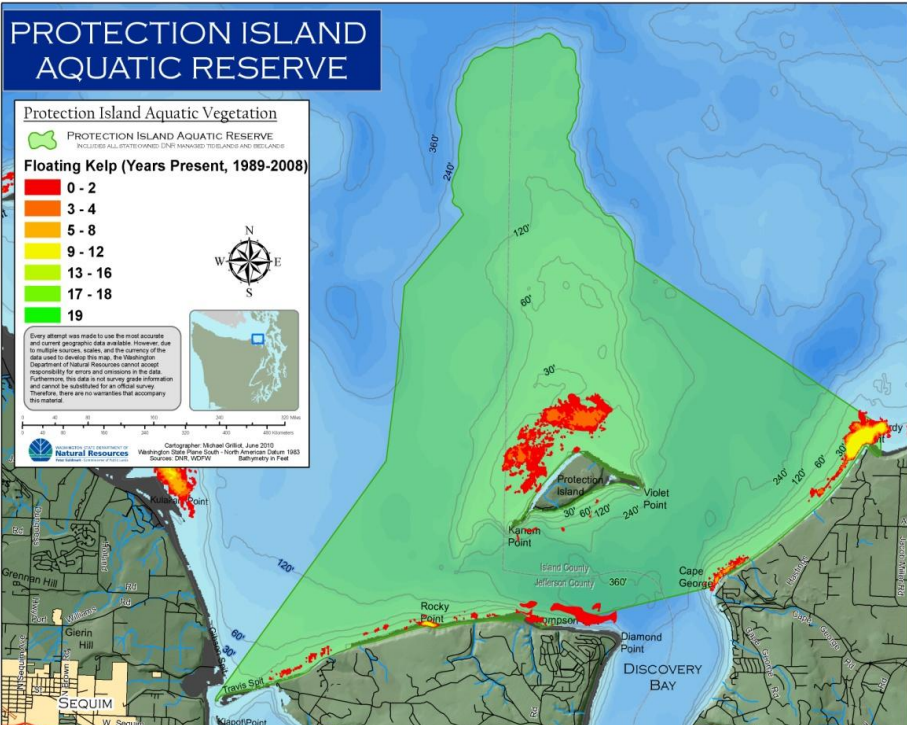




Figure 4 – Bald Eagle Observations

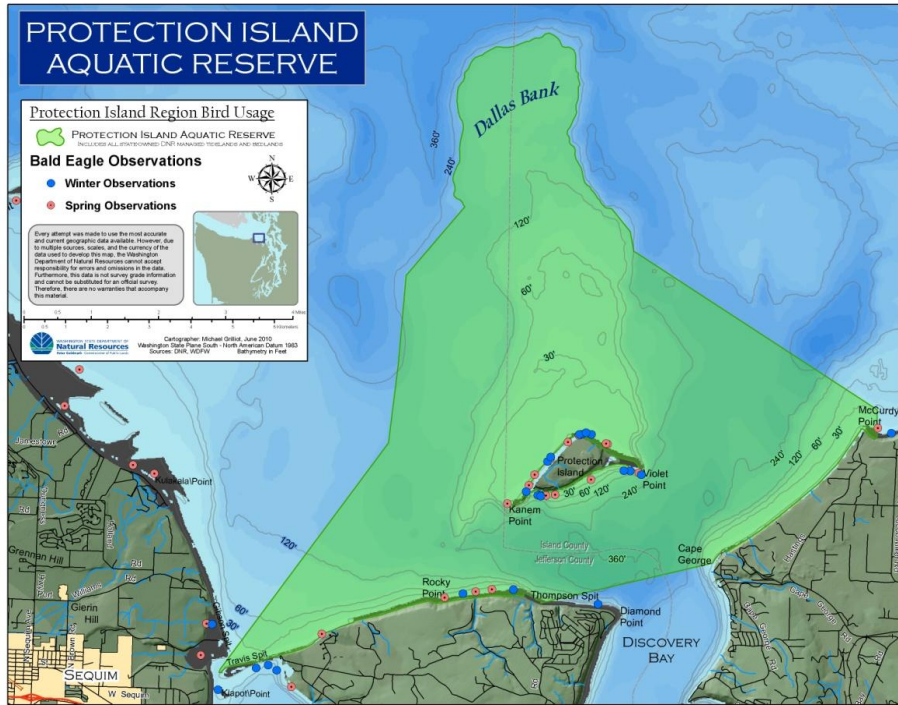


Figure 5 – Common Loon, Harlequin Duck, and Marbled Murrelet Observations

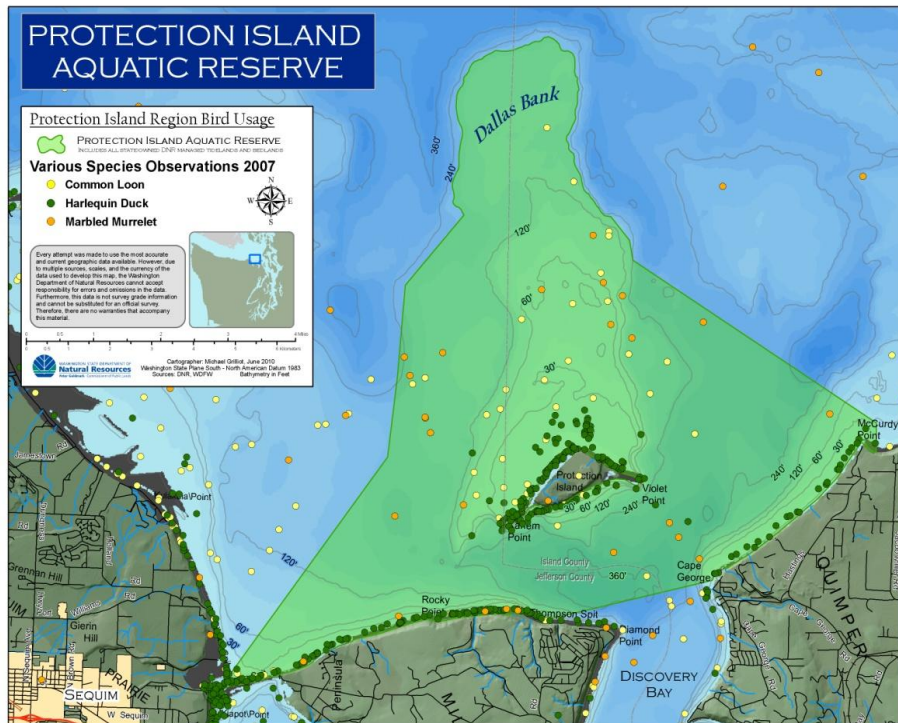


Figure 6 – Geoduck Harvestable Tracts

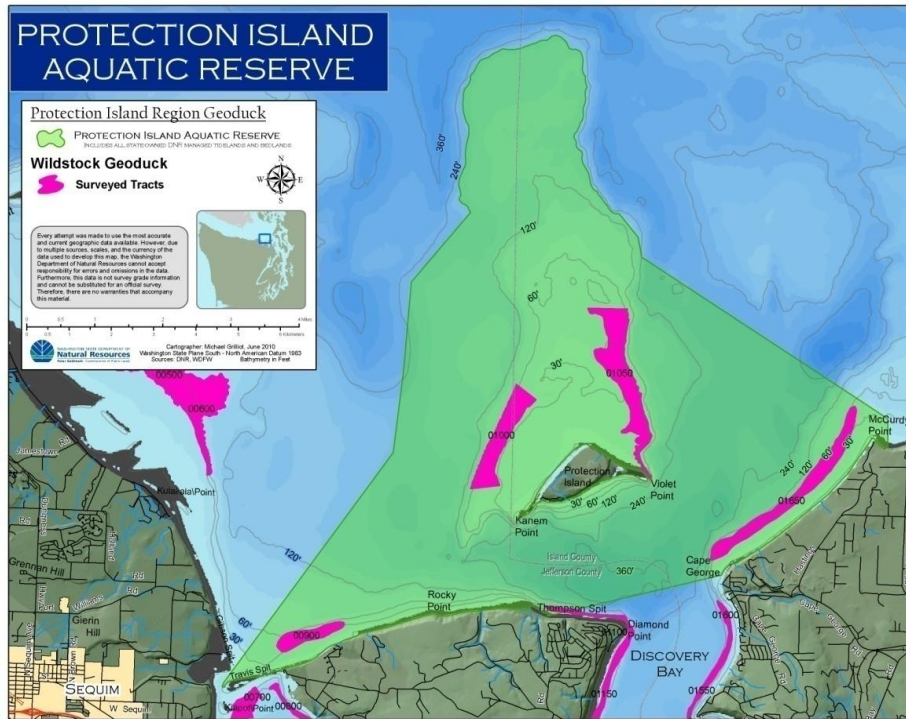
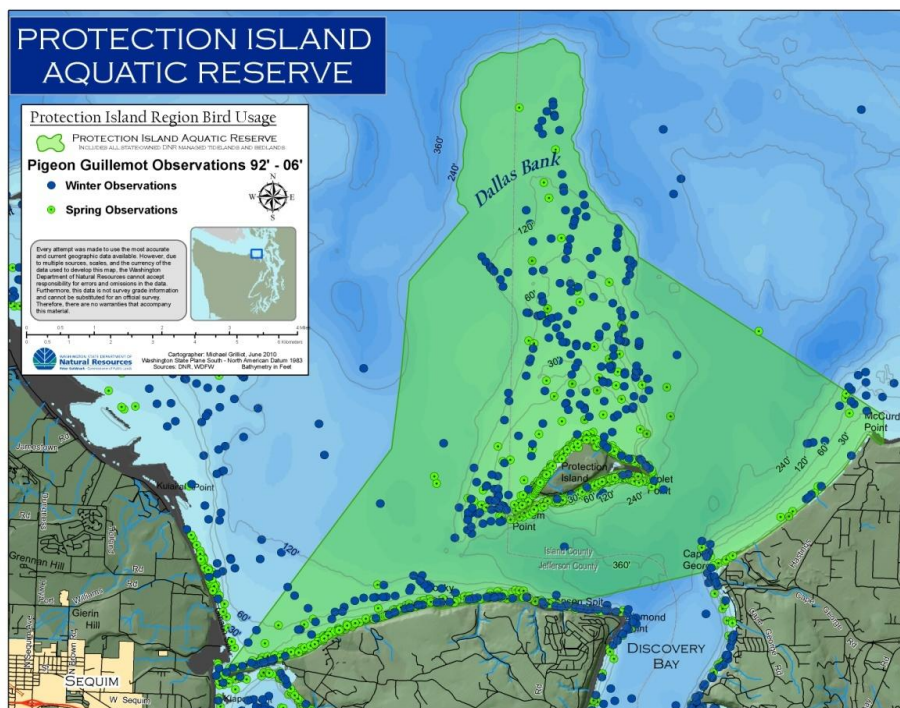
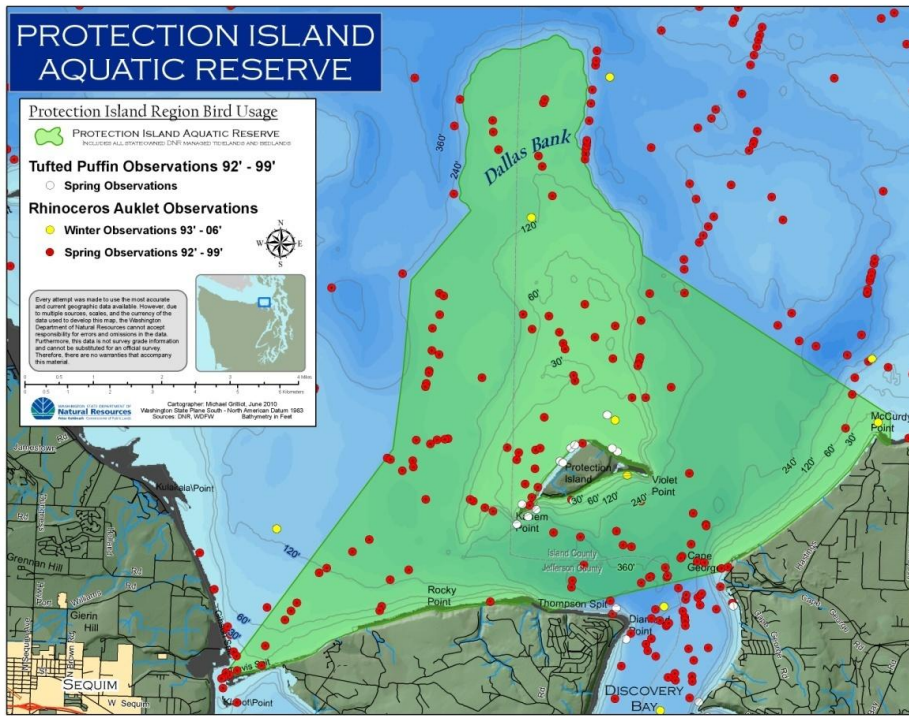


Figure 7 – Pigeon Guillemot Observations





**Figure 8 – Tufted Puffin and Rhinoceros Auklet Observations**



**Figure 9 – Nearshore Surfgrass Presence**

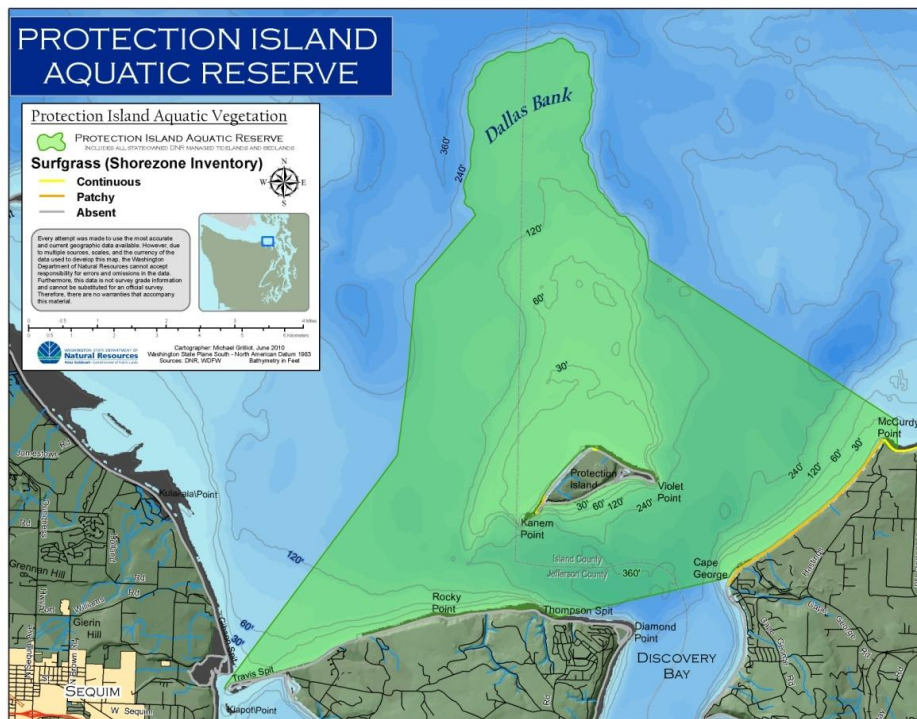


Figure 10 – Percent Shoreline Modification

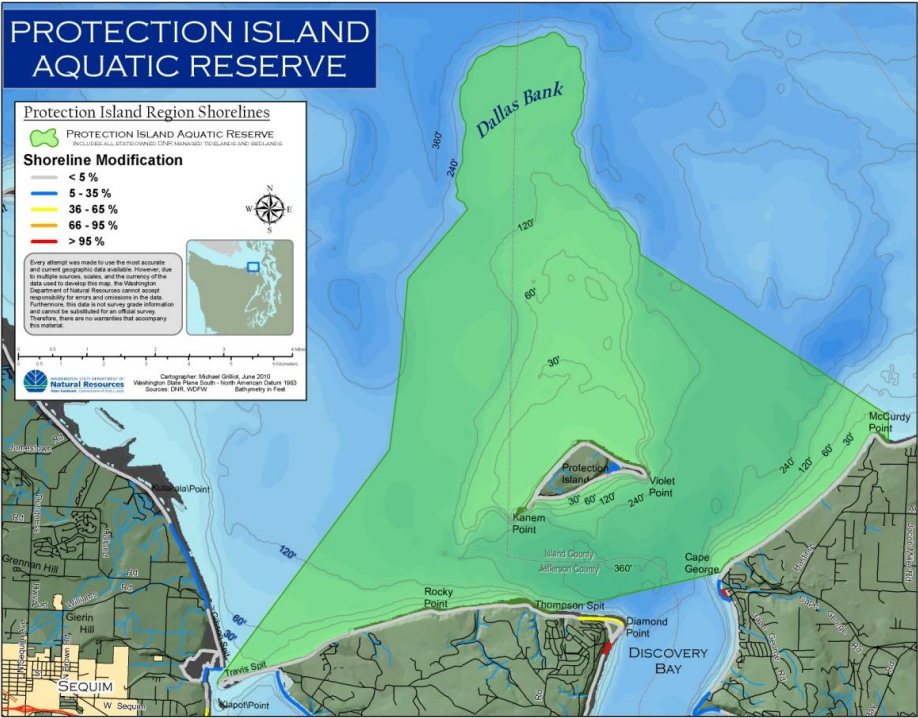


Figure 11 – Shoreline Type

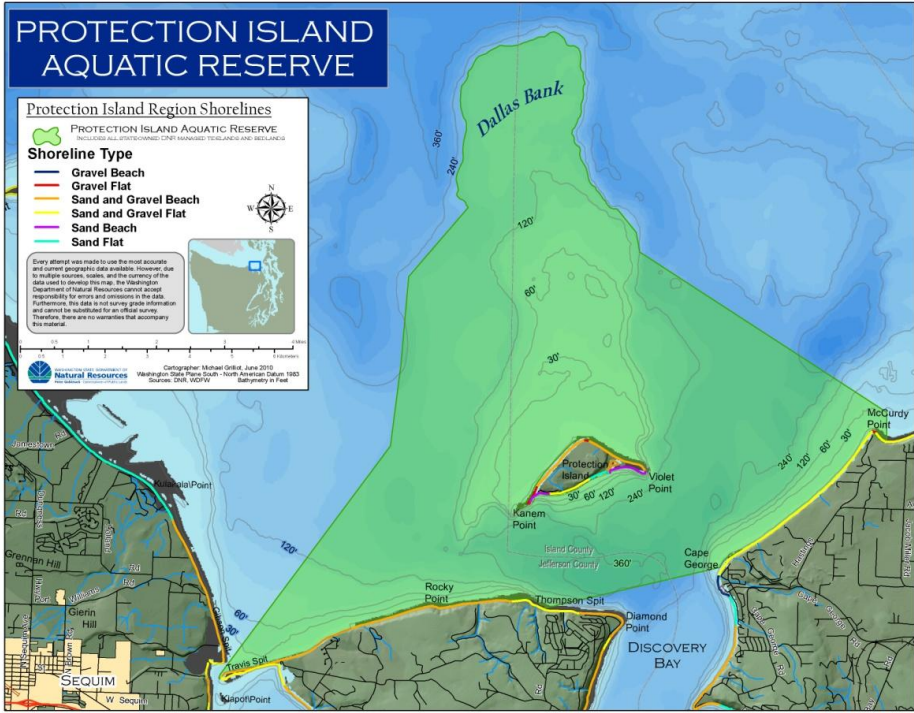
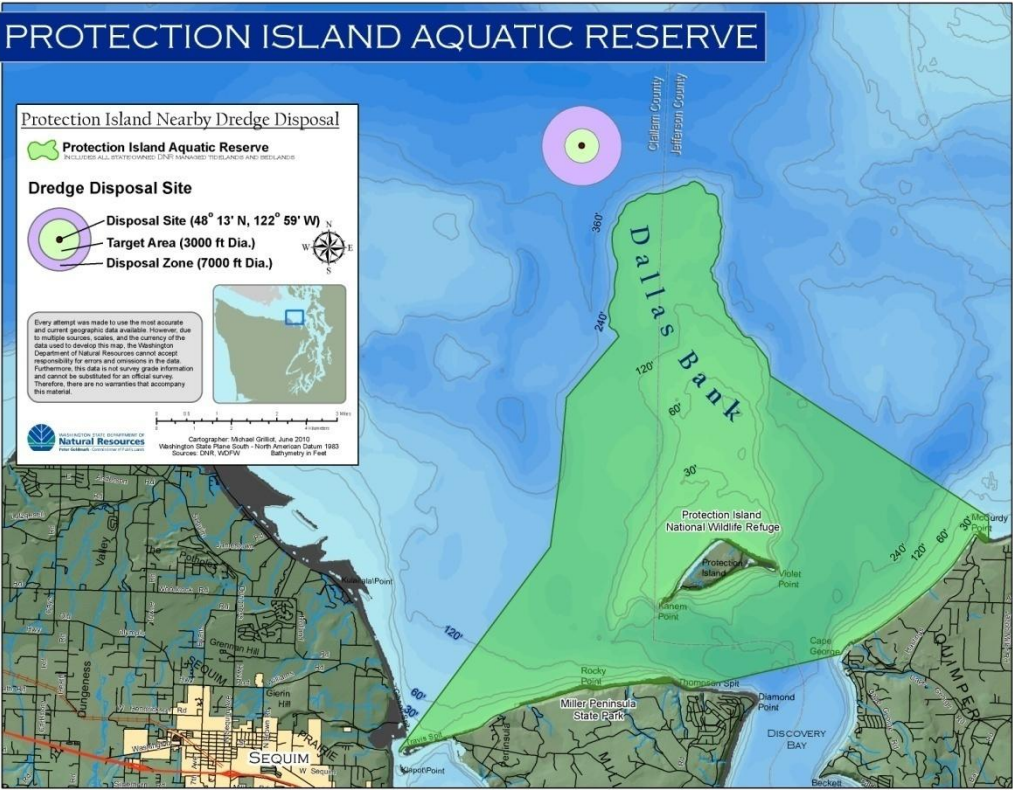




Figure 12 – Jefferson County Drift Cells



Figure 13 – Port Townsend Dredge Material Disposal Site





---

# Appendix C – Legal Description of Protection Island Aquatic Reserve

## PROTECTION ISLAND AQUATIC RESERVE

### DESCRIPTION:

A portion of the tidelands and bedlands owned by the State of Washington within the Strait of Juan De Fuca in Clallam County and in Jefferson County, Washington. Said tidelands are fronting and abutting government lots 1 and 2 of Section 33, and government lot 1 of Section 34, all in Township 31 North, Range 2 West, Willamette Meridian; government lot 1 of Section 31, and government lots 1 and 2 along with a portion of government lot 3 of Section 32, all in Township 31 North, Range 1 West, Willamette Meridian; government lots 1 to 4 of Section 6, Township 30 North, Range 1 West, Willamette Meridian; government lots 1 to 3 of Section 3, government lots 1 to 4 of Section 4, government lot 1 of Section 1, government lots 1 and 2 along with a portion of government lot 3 of Section 12, government lots 1 and 2 of Section 15, government lots 1 to 4 of Section 16, government lots 1 to 4 of Section 17, and government lots 1 to 4 of Section 18, all in Township 30 North, Range 2 West, Willamette Meridian; government lots 1 to 3 of Section 13, government lot 1 of Section 24, government lots 1 to 4 of Section 23, and government lot 6 of Section 22, all in Township 30 North, Range 3 West, Willamette meridian.

### The reserve parcel is further described as follows:

Per the description of Tract 2 of those Oyster Tracts sold to A. A. Bugge by that deed dated September 21, 1932 and filed in Volume 17 at Page 339 in State Records of Tideland and Shoreland Deeds at the Office of the Commissioner of Public Lands, **Commence** at the South Meander Corner common to Sections 22 and 23, Township 30 North, Range 3 West, Willamette Meridian, in Clallam County, Washington; thence run along the balanced Government Meander Line in front of said Section 22, at S65°11'07"W for 15.96 chains and N14°51'36"W for 3.77 chains, to a corner of said Tract 2, lying at the head of Sequim Bay and Westerly of Travis Spit, said corner being the **Point of Beginning** of this description; thence West for 1.69 chains along tract 2; thence Northwesterly for 100 feet, more or less, to a geographic position with a Latitude of 48°04'47.352" North and a Longitude of 123°02'32.110 West; thence



---

Northeasterly for 300 feet, more or less, to a geographic position with a Latitude of 48°04'50.121" North and a Longitude of 123°02'30.461" West; thence Northeasterly for 2,200 feet, more or less, to a geographic position with a Latitude of 48°07'48.747" North and a Longitude of 122°59'24.539" West; thence Northerly for 13,200 feet, more or less, to a geographic position with a Latitude of 48°09'58.473" North and a Longitude of 122°59'10.022" West; thence N40°46'36"E for 7,100 feet, more or less, to a position vertically at a bathymetric contour of minus 200 feet below the Line of Mean Lower Low Water along the Westerly slopes of Dallas Bank; thence Northerly for 13,000 feet, more or less, Northeasterly for 6,000 feet, more or less, Southeasterly for 3,000 feet more or less, and Southerly for 14,000 feet, more or less, along said bathymetric contour along the Westerly, Northwesterly, Northeasterly and Easterly slopes of Dallas Bank to an intersection with a Latitude of 48°10'55" North; thence departing from said bathymetric contour on the Easterly slopes of said Dallas Bank, Southeasterly for 2,300 feet, more or less, to a geographic position with a Latitude of 48°10'37.593" North and a Longitude of 122°54'51.905" West; thence Southerly for 1,500 feet, more or less, to a geographic position with a Latitude of 48°10'22.786" North and a Longitude of 122°55'47.229" West; thence Southeasterly for 22,800 feet, more or less, to a geographic position with a Latitude of 48°08'25.848" North and a Longitude of 122°49'59.547" West; thence South for 2,200 feet, more or less, to the Line of Mean High Tide fronting said government lot 3, of Section 32, Township 31 North, Range 1 West, Willamette Meridian; thence Northwesterly along said Line of Mean High Tide for 1,400 feet, more or less, fronting a portion of said government lot 3; thence Southwesterly along said Line of Mean High Tide for 3,600 feet, more or less, fronting government lots 1 and 2 of said Section 32, and government lot 1 of Section 31 of said Township 31 North, Range 1 West; thence continuing Southwesterly along said Line of Mean High Tide for 6,300 feet, more or less, fronting government lots 1 to 4 of Section 6, of said Township 30 North, Range 1 West; thence continuing Southwesterly along said Line of Mean High Tide for 6,000 feet, more or less, fronting government lot 1 of Section 1, government lots 1 and 2, along with a portion of government lot 3 of Section 12, all in said Township 30 North, Range 2 West to the intersection of said Line of Mean High Tide and the North Line of the Southwest Quarter of said Section 12; thence Westerly along the prolongation of the North Line of the Southwest Quarter of said Section 12, to the Line of Extreme Low Tide; thence Southwesterly for 9,400 feet, more or less, to the Northwest Corner of the Second Class Tidelands sold to James B. Huckins by that deed dated July 11, 1950 and filed in Volume 21 at Page 394 in State Records of Tidelands and Shoreland Deeds at the Office of the Commissioner of Public Lands; thence Southerly along a lateral side line of said Second Class Tidelands for 150 feet, more or less, to a point on the Line of Mean High Tide, described in said deed sold to James B. Huckins as bearing East for 14.22 chains from the west line of government lot 2 of said Section 15, Township 30 North,

---

Range 2 West; thence Westerly along said Line of Mean High Tide for 19,000 feet, more or less, fronting government lot 1 and a portion of government lot 2 of Section 15, government lots 1 to 4 of Section 16, government lots 1 to 4 of Section 17, and government lots 1 to 4 of Section 18, all in said Township 30 North, Range 2 West; thence continuing Westerly along said Line of Mean High Tide for 8,000 feet, more or less, fronting government lots 1 to 4 of Section 13, government lot 1 of Section 24, and government lot 1 of Section 23, all in said Township 30 North, Range 3 West; thence continuing Westerly along said Line of Mean High Tide for 5,300 feet, more or less, fronting government lots 2 to 4 of Section 23, and government lot 6 of Section 22, being along the North side of Travis Spit, all in said Township 30 North, Range 3 West, to a point on the Line of Mean High Tide and bears N66°49'E for 50 feet, more or less, from the **Point of Beginning**; thence S66°49'W for 50 feet, more or less, to the **Point of Beginning**.

**EXCEPTING THEREFROM:**

The uplands known as Protection Island lying above the Line of Mean High Tide.

Those tidelands extending from Mean High Tide to Extreme Low Tide sold to J. Frederick Palmer by that deed dated July 3, 1950 and filed in Volume 21 at Page 369 in State Records of Tidelands and Shoreland Deeds at the Office of the Commissioner of Public Lands.

Those tidelands extending from Mean High Tide to Extreme Low Tide sold to Bernard S. Douglas by that deed dated October 19, 1960 and filed in Volume 23 at Page 112 in State Records of Tidelands and Shoreland Deeds at the Office of the Commissioner of Public Lands.

**SUBJECT TO:**

The Protection Island National Wildlife Refuge.

The interagency agreement between WADNR and the U.S. Fish and Wildlife Service under authorization 20-013245.

Withdrawal order No. 88-107 approved on November 22, 1988 for bedlands and tidelands extending 600 feet from the Line of Extreme Low Tide surrounding Protection Island for the benefit of the Zella Schultz Seabird Sanctuary and Protection Island National Wildlife Refuge.

An easement for Right of Way for a submarine cable crossing over the Tidelands of the second class and the Bed of Sequim Bay granted to Pacific Northwest Bell Telephone Company under authorization 51-034103.

A lease of Tidelands for a concrete launch ramp for launching private recreational boats granted to Diamond Point Beach Club, 1<sup>st</sup> Addition Inc. under lease authorization 20-A009519.

---

A lease of Tidelands for a private boat ramp to launch private small boats, kayaks, and car top boats, granted to Sunshine Acres Property Owners Association under lease authorization 20-A011819.