NATURAL RESOURCES

Maury Island Aquatic Reserve Management Plan

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Peter Goldmark - Commissioner of Public Lands

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Peter Goldmark, Commissioner of Public Lands
Megan Duffy, Deputy Supervisor, Aquatic Resources

Shoreline District
Derrick Toba, Assistant Division Manager
Shannon Soto, Aquatic Land Manager

Aquatic Resources Division
Kristin Swenddal, Division Manager
Michal Rechner, Assistant Division Manager
David Palazzi, Planning Program Manager
Roberta Davenport, Aquatic Reserves Program Manager
Betty Bookheim, Natural Resource Scientist
Jamie Kilgo, Environmental Planner

GIS and Mapping
Jamie Kilgo, Environmental Planner

Communications
Jane Chavey, DNR Communications

Principal Authors
Roberta Davenport, Aquatic Reserves Program Manager
Betty Bookheim, Natural Resource Scientist
Jamie Kilgo, Environmental Planner
Michelle Bahnick, Puget SoundCorps
Elizabeth Ellis, Environmental Planner, CEP

Maury Island Aquatic Reserve Implementation Committee, 2014
Amy Carey, SoundAction
Ann Stranberg, Gold Beach Property Owner
Bianca Perla, Vashon Nature Center
Buzz Blich, Quartermaster Yacht Club
Captain Joe Wubbold, Keepers of Point Robinson
Carl Sells, Vashon Island Resident
Connie Blumen, King County Natural Resource Lands
Erin Durrett, Vashon Beach Naturalists
Greg Rabourn, King County Water Land Resource Division
Jeanette Dorner, Puget Sound Partnership
Jeff Adams, Washington Sea Grant
Joe Van Hollebeke, King County Parks
Jon Crouch, Quartermaster Yacht Club
Karlista Rickerson, Washington Scuba Alliance
Kathryn True, Vashon Nature Center
Lou Ann Branch, Vashon Park District
Maddie Foutch, Washington Environmental Council
Mike Mattingly, Vashon Sportsmen's Club
Odin Lonning, Vashon Hydrophone Project
Pat Collier, Vashon Island Resident
Rayna Holtz, Vashon Beach Naturalists
Sally Ammon, Vashon Beach Naturalists
Scott Snyder, King County Parks
Susie Kalhorn, SoundAction
Tag Gornell, Island Greentech
Tom Dean, Vashon Land Trust
Tristan Peter-Contesse, Puget Sound Partnership

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

Aquatic Reserves Program Manager

Phone: 360-902-1100

E-mail: aquaticreserve@dnr.wa.gov

Web: www.dnr.wa.gov

Those needing this information in an alternative format, please call TTY-711

Cover photo: Point Robinson, Maury Island Aquatic Reserve. Provided by Aquatic Reserves Program

Maury Island Aquatic Reserve Management Plan

AN ENVIRONMENTAL AQUATIC RESERVE

Washington State Department of Natural Resources
Aquatic Resources Division

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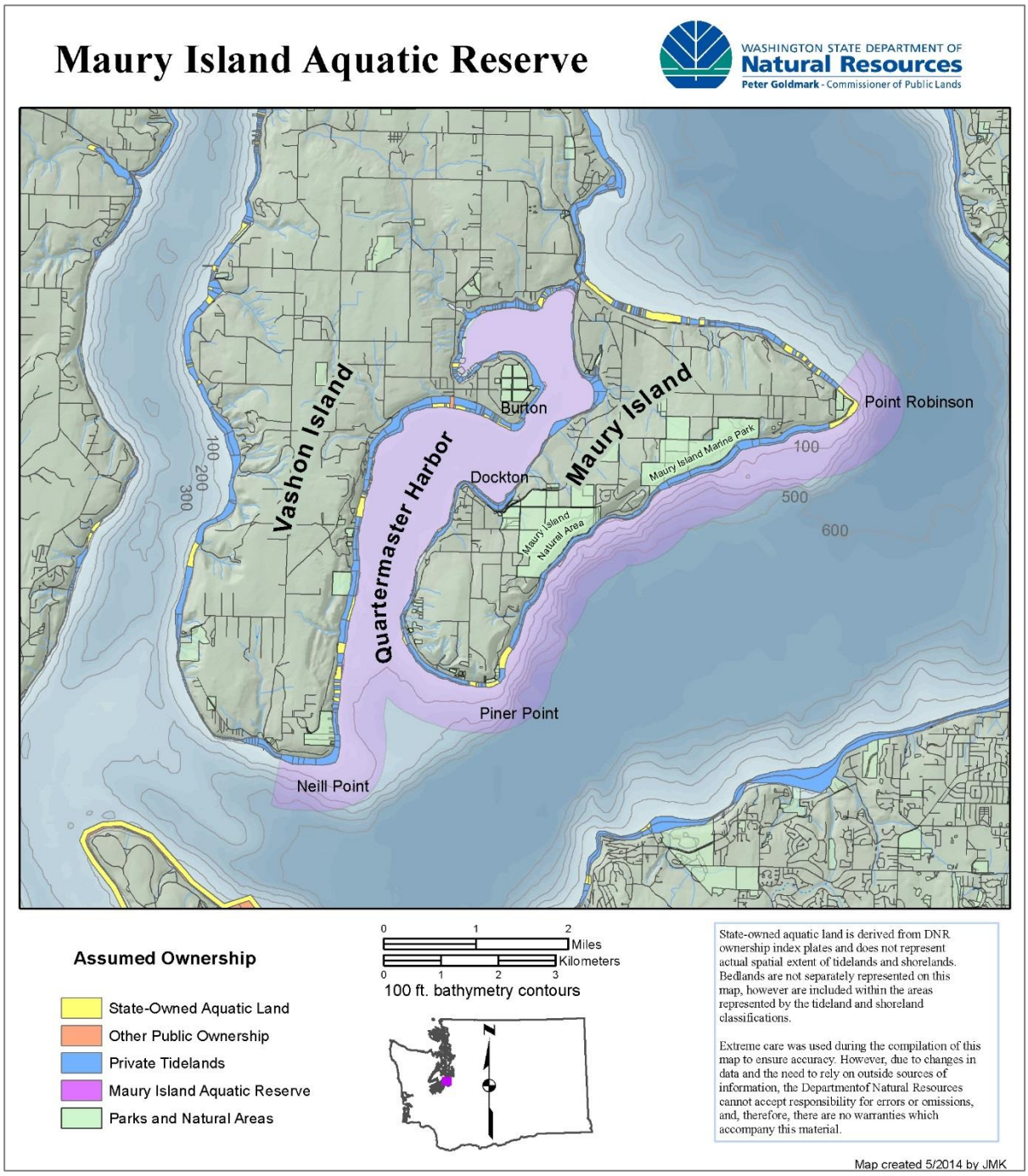
Acronyms

CSC	Community Stewardship Committee
Corps	U.S. Army Corps of Engineers
DNR	Washington State Department of Natural Resources
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DVRP	DNR Derelict Vessel Removal Program
EPA	United States Environmental Protection Agency
IBA	Important Bird Area
MLLW	Mean Lower Low Water
MRA	Marine Recovery Area
NOAA	National Oceanographic and Atmospheric Administration
PSC	Puget SoundCorps
PSP	Puget Sound Partnership
QMH	Quartermaster Harbor
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WSDA	Washington State Department of Agriculture

Figure 1: Maury Island Aquatic Reserve



1. Executive Summary

The Maury Island Aquatic Reserve is established as an environmental reserve to ensure protection of the unique habitats and species identified in the area and promote 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 Department of Natural Resources (DNR) to conserve these resources with an emphasis on environmental protections 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 and support the desired future conditions. This management plan does not apply to private tideland or upland property owners. DNR management authority extends only to state-owned aquatic lands.

The following management goals have been established for the aquatic reserve:

1) Protect, enhance and restore the integrity of natural nearshore habitats and function of shoreline processes for the benefit of native plants and wildlife.
2) Gather and assess ecological and human use information to support adaptive management decisions.
3) Promote stewardship of aquatic habitats and species by providing education and outreach opportunities and promoting coordination and partnerships with other resource managers.
4) Promote sustainable management of uses in and adjacent to the reserve, and minimize impacts to habitats and species.

The Maury Island Aquatic Reserve was established as an aquatic reserve in 2000 and a management plan was adopted in 2004. In accordance with the adaptive management 10-year review process, this plan serves as a comprehensive updated management plan. It allows for critical evaluation of goals, objectives and management actions in consideration of changes in ecosystem condition and existing uses of state-owned aquatic lands. DNR and the Maury Island Aquatic Reserve Implementation Committee used current research and monitoring data to guide the review process and develop the following management guidance. The management plan will continue to be updated as necessary every ten years throughout the 90-year term of the reserve designation.

2. Introduction

I. Washington's Department of Natural Resources

DNR manages over 2.6 million acres of state-owned aquatic lands. This includes 64,000 acres of tidelands, 32,000 acres of shorelands, and 2.46 million acres of marine and freshwater bedlands. In addition, there are approximately 13,000 acres of other aquatic lands, such as Harbor Areas, waterways and abandoned lands, that fall under DNR management.

DNR is directed by the Revised Code of Washington (RCW) to manage state-owned aquatic lands to provide a balance of public benefits that include encouraging public use and access, fostering water-dependent use, ensuring environmental protection, and utilizing renewable resources. DNR is directed to generate revenue from state-owned aquatic lands when it is consistent with the other public benefits. DNR manages the state's sensitive aquatic lands and, when necessary, removes them from conflicting uses. As part of this authority, under Washington Administrative Code (WAC) 332-30-151, DNR can establish environmental, scientific, and educational aquatic reserves.

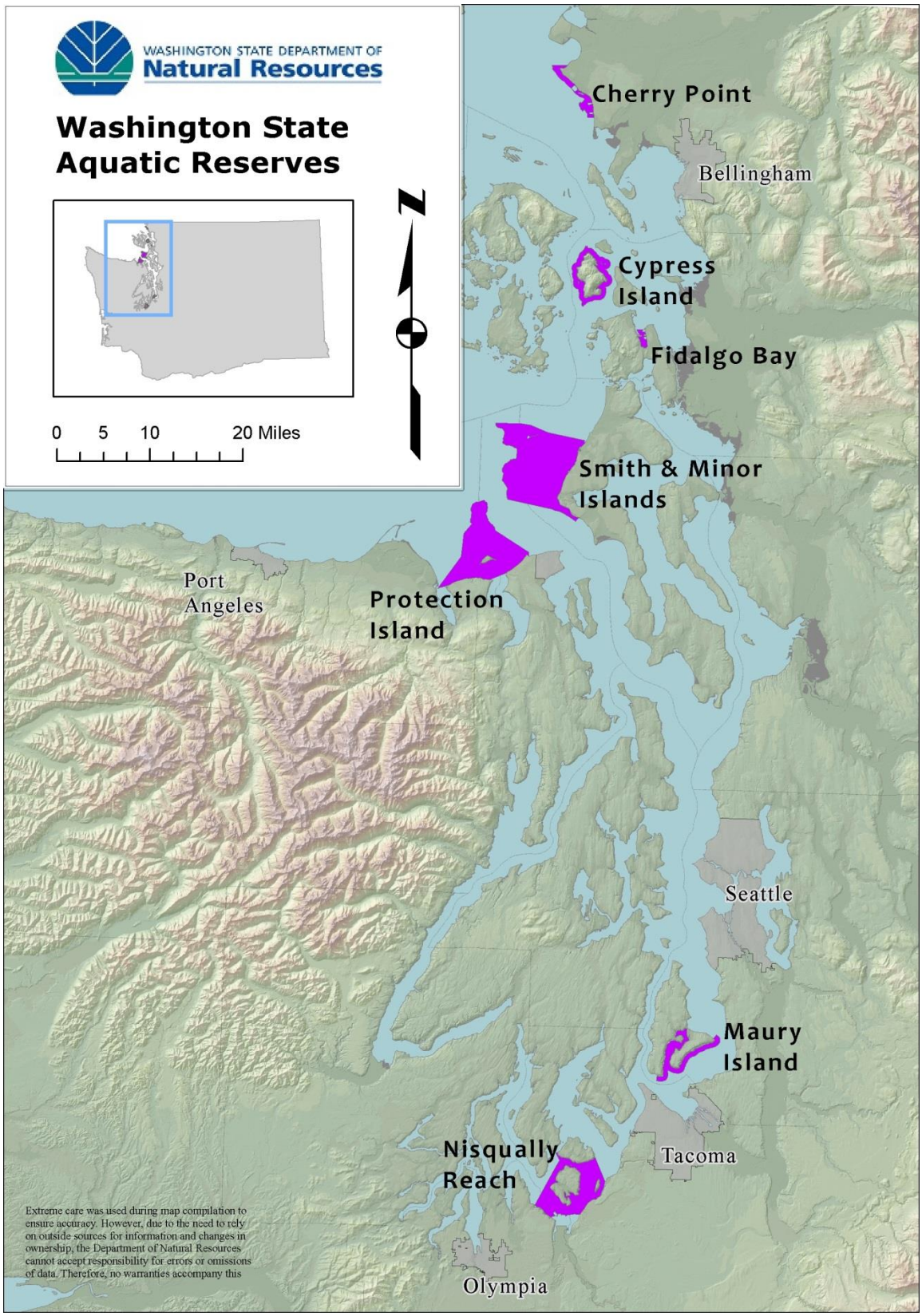
II. Aquatic Reserves Program

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 the state of Washington (WAC 332-30-151). The reserve program meets an increasing need for site-based conservation management of state-owned aquatic land. The Aquatic Reserves Program examines past successes in site-based conservation to ensure that aquatic reserve status is applied when it is the most appropriate management tool (DNR 2005).

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.

DNR and its partners manage each reserve in a manner consistent with the goals, objectives, management actions, and desired future conditions outlined in site-specific management plans.

Figure 2: DNR Aquatic Reserves



Legal Authorities for Establishing State Aquatic Reserves

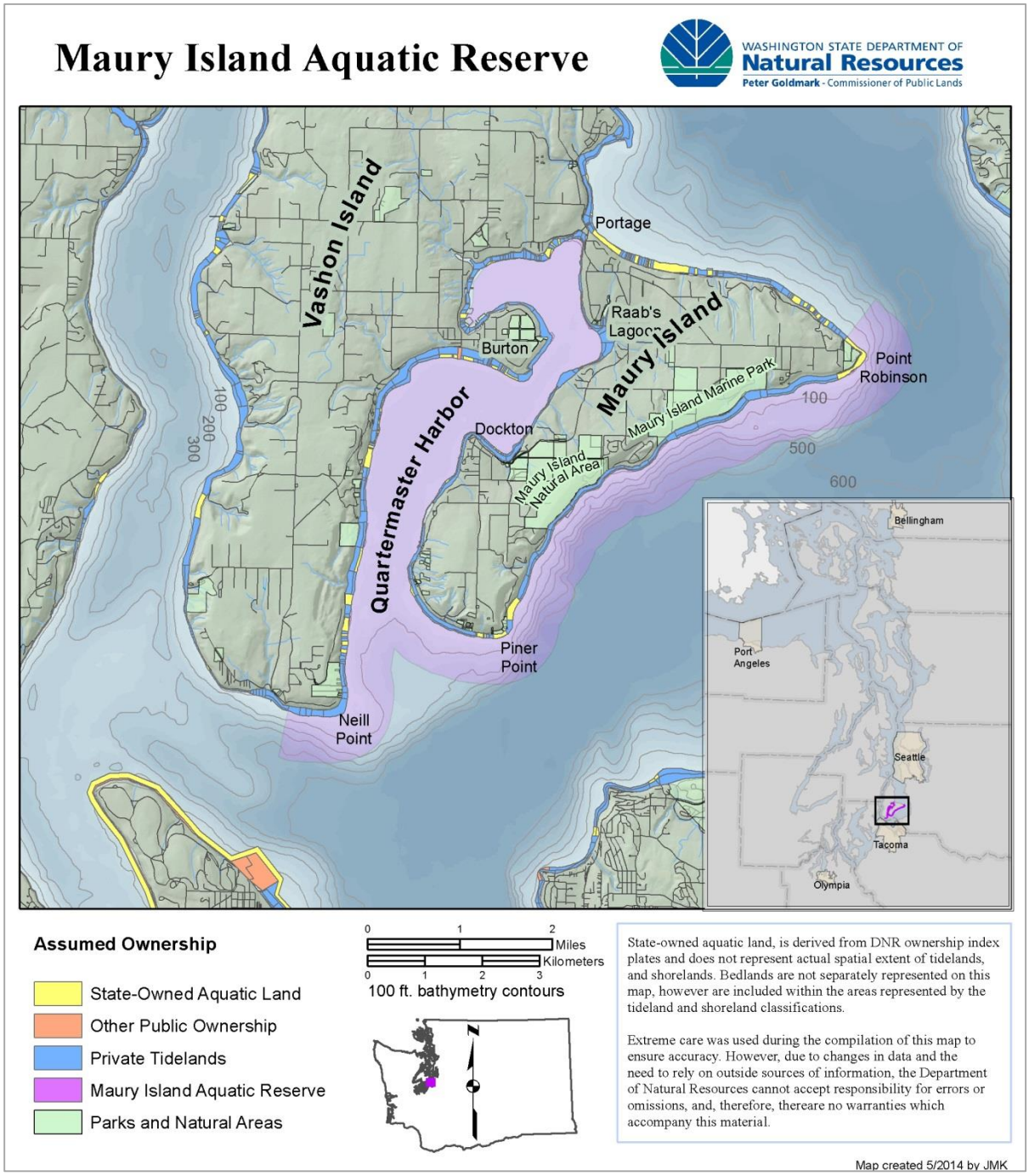
The constitutional authority for proprietary management of state-owned aquatic lands is derived from Articles XV and XVII of the Washington State Constitution. DNR is directed by state legislature in RCW 79.100 through 79.145 to manage the state-owned aquatic lands to provide a balance of public benefits that include encouraging public use and 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 further authorizes DNR, for the purpose of providing increased continuity in the management of public lands and of facilitating long-range planning by interested agencies, to identify and withdraw from all conflicting uses limited acreages of public lands. Withdrawn public lands are to be maintained for the benefit of the public as areas whose natural ecological systems can be observed, studied, enjoyed, or otherwise utilized. WAC 332-30-151 directs DNR to consider lands with educational, scientific, and environmental values for aquatic reserve status, and identifies management guidelines for aquatic reserves. WAC 332-30-106(14) defines educational reserves as educationally important areas with aquatic lands typical of selected habitat types which are suitable for educational projects. 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. 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.

III. Maury Island Aquatic Reserve

The Maury Island Aquatic Reserve encompasses approximately 5,530 acres of state-owned aquatic tidelands and bedlands around Vashon-Maury Island. The reserve extends from Neill Point on Vashon Island, including Quartermaster Harbor, Piner Point and the eastern shore of Maury Island, to Point Robinson near Luana Beach (Figure 3). The reserve boundary extends offshore to a depth of 70 feet (21.4 meters) below mean lower low water (MLLW) or one-half mile from the line of extreme low tide, whichever is farther waterward. Section 3 of this document provides a more thorough geographic, physical, and biological description of the Maury Island Aquatic Reserve.

Figure 3: Maury Island Aquatic Reserve assumed ownership and general vicinity



Legal Boundaries

For a complete legal description of the Maury Island Aquatic Reserve boundaries please refer to Appendix C, which contains the DNR Commissioner's Withdrawal and Designation Orders for Maury Island Aquatic Reserve.

Aquatic Reserve Designation Process

Maury Island Aquatic Reserve was established in 2000 with a Commissioner's Order from former Commissioner of Public Lands Jennifer Belcher. In September 2002 DNR adopted the

final environmental impact statement for the administration of the Aquatic Reserves Program, the *Non-Project Final Environmental Impact Statement Aquatic Reserves Program Guidance*, after which site-specific management plans could be developed (DNR 2002).

In October 2004, the *Final Supplemental Environmental Impact Statement Maury Island Aquatic Reserve* and the *Maury Island Environmental Aquatic Reserve Final Management Plan* were adopted in accordance with the State Environmental Policy Act (SEPA) (DNR 2004a; DNR 2004b). This was the first reserve-specific management plan adopted in the Aquatic Reserves Program. Former Commissioner of Public Lands Doug Sutherland issued a Commissioner's Order referencing the newly adopted management plan (see Appendix C) and retracted Jennifer Belcher's 2000 Commissioner's Order.

This Maury Island Aquatic Reserve Management Plan is part of the adaptive management 10-year update and review process, and will replace the earlier 2004 management plan.

IV. Purpose of the Maury Island Aquatic Reserve Management Plan

The management plan describes the habitats, ecosystem features and associated species identified for conservation in the aquatic reserve and the actions that will be implemented to protect these resources. The plan reflects the current site conditions, scientific knowledge and human uses within the reserve, and will be used to guide management of the Maury Island Aquatic Reserve. The plan describes research goals for the aquatic reserve and identifies future research needs. In addition, the plan identifies the public stewardship and education opportunities. The management emphasis will place protection of these environmental resources above other management actions.

This management plan is the product of the first 10-year review and is a comprehensive, updated plan that will serve as DNR's primary management guidance for Maury Island Aquatic Reserve. During the development of this plan, DNR worked with the Maury Island Aquatic Reserve Implementation Committee in a collaborative planning process to establish an updated management guidance. Management of the aquatic reserve will be guided primarily by the following sections of this plan, described here:

1. **Maury Island Aquatic Reserve**: This serves as an introduction to the site and includes several sections that describe current conditions and uses.

    - *Site characterization, conservation targets*: Describes environmental resource characteristics and current ecological conditions. Identifies conservation targets.
    - *Current uses and progress*: Includes updated current conditions, uses and future impacts, and describes progress made towards meeting reserve objectives since the 2004 management plan was adopted.

2. **Management Guidance**: Describes the desired future ecological conditions, goals, objectives and management actions that will aide in site management decision-making. Goals, objectives and management actions reflect new scientific knowledge, current ecological conditions, changing uses and progress made in the last 10 years.

3. **Implementation Guidance**: Describes how the management guidance will be implemented and outlines the role of the Maury Island Aquatic Reserve Implementation Committee.

Adaptive Management

Adaptive management is a systematic, iterative process for continually improving site management by learning from the results of past management actions. To ensure that the future desired conditions of the aquatic reserve site are met and that adaptive management is being implemented, the management plan will be reviewed and updated as necessary 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. During the development of each subsequent update, DNR will work with other jurisdictions, Tribes, interest groups, adjacent landowners, leaseholders, and local citizens to establish cooperative management for activities within and adjacent to the reserve.

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 goals, objectives and management actions are not successfully contributing to the desired future conditions 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 or adaptations will not be restricted to every 10 years.

V. Relationship to other Federal, State, Local and Tribal Management

This plan is promulgated under DNR's proprietary authority to manage state-owned aquatic lands. However, the successful management of the reserve will require coordination and collaboration with public and private entities at the local, state, federal, and tribal levels. This section provides detail on proprietary, regulatory and management interests within or directly adjacent to the boundaries of the Maury Island Aquatic Reserve.

Tribal Interests at Maury Island

Tribes manage cultural and natural resources located on adjacent reservation lands, and those resources related to the right to fish and gather off-reservation at usual and accustomed places. DNR is obligated to conduct government-to-government consultations with all federally recognized Tribes, under the 1989 Centennial Accord, http://www.goia.wa.gov/Government-to-Government/Data/CentennialAccord.htm.

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.

Tribes and the State of Washington have developed a cooperative framework which provides for fisheries management and habitat protection. This plan recognizes the policy statement developed by the Northwest Indian Fisheries Commission on behalf of member Northwest Tribes

discussing the importance of considering the impacts conservation measures can have on tribal economics, subsistence and culture. Under this, Northwest Tribes highly recommend that the creation of any Marine Protected Area (local, state, federal or otherwise) such as an aquatic reserve not occur in the absence of any demonstrated need. In the face of such demonstrated need, Northwest Tribes do recognize that Marine Protected Areas may be useful tools for protecting or sustaining resources (Northwest Indian Fisheries Commission 2011). In line with this policy, one of the primary goals of this management plan is to help demonstrate the need for protecting, sustaining, and restoring natural resources.

Puyallup Tribe

The reserve is located within the Puyallup Tribe's exclusive usual and accustomed fishing area. As such, it is essential that conservation goals and management activities established not conflict with the Puyallup Tribe's management and interests. DNR will engage in a government-to-government dialog with the Puyallup Tribe to ensure that their treaty rights and trust responsibilities are upheld throughout the 90-year term of the reserve.

U.S. Coast Guard

The U.S. Coast Guard manages vessel activity to ensure the safety of vessels during transit and while in port throughout Washington State's marine waters. The Coast Guard is the lead response agency for spills in coastal waters and deepwater ports, for navigational hazards, and for other pollution. The Coast Guard also implements federal ballast water laws and regulate the discharge of onboard sewage in federal waters.

U.S. Army Corps of Engineers

Under Section 10 of the Rivers and Harbors Act, the U.S. Army Corps of Engineers (Corps) oversees any in-water construction in navigable waters. Additionally, the Corps has been delegated authority under the Clean Water Act for the issuance of Section 404 permits. The Corps supports navigation by maintaining and improving channels; develops projects to reduce flood damage, and regulates dredging and filling activities in wetlands and waterways including the construction of any structures such as bulkheads or piers. Like all federal agencies, the Corps must ensure that tribal trust resources are protected prior to taking any action that could potentially affect treaty-protected resources, including fishing and traditional cultural properties.

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) is the lead federal response agency for oil spills occurring in inland waters, i.e. the Straits of Juan de Fuca and the Puget Sound, and jointly administers Section 404 of the Clean Water Act with the U.S. Army Corps of Engineers.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service is charged with protecting plant, terrestrial animal, and some fish species listed under the federal Endangered Species Act and the Migratory Bird Treaty Act and the habitats those species rely upon. They are also mandated to coordinate with state agencies through the Fish and Wildlife Coordination Act.

National Oceanic and Atmospheric Administration Fisheries

National Oceanic and Atmospheric Administration (NOAA) Fisheries is responsible for protection of marine and freshwater species under the Endangered Species Act and the Marine Mammal Protection Act. NOAA Fisheries also is responsible for consultation under the Magnuson-Stevens Fishery Conservation and Management Act.

Washington State Department of Health

The state Department of Health (DOH) regulates opening and closing of recreational and commercial shellfish zones and advises the public as to the healthy recreational harvest of shellfish.

Washington State Department of Ecology

The Washington State Department of Ecology (DOE) administers several programs that protect environmental resources, including Spill Prevention, Preparedness and Response, Air Quality, Water Quality, Toxics Cleanup, Shorelands Assistance, Water Resources, Solid Waste, and Hazardous Waste and Toxic Reduction.

DOE's Spill Prevention, Preparedness and Response Program focuses on prevention of oil spills to Washington waters and land, as well as planning for an effective response to any oil and hazardous substance spills that may occur. DOE also reviews and must approve local Shoreline Master Programs and all plans for major substantial development permits involving construction in waters of the state.

DOE works to maintain water and sediment quality standards, such that listing of waterbodies or segments as impaired under section 303(d) of the Clean Water Act is unnecessary. They are responsible for developing and approving National Pollutant Discharge Elimination System permits for industrial and municipal discharges. Nonpoint source pollution is managed through a variety of state and local programs; DOE has developed a nonpoint pollution plan that focuses on local land-use activities. Finally, DOE issues water quality consistency certifications under Section 401 of the Clean Water Act, which help ensure compliance with the law's Anti-degradation Policy. The DNR will seek to cooperate with Ecology's Northwest Regional Office and Stormwater Section.

Washington State Department of Fish and Wildlife

The Washington Department of Fish and Wildlife (WDFW) is responsible for preserving, protecting, and perpetuating all fish and shellfish resources of the State. To assist in achieving that goal, the State Legislature passed a state law now known as the "Hydraulic Code" (Chapter 77.55 RCW) in 1949. The law requires that any person, organization, or government agency wishing to conduct any construction activity that will use, divert, obstruct, or change the bed or flow of State waters must do so under the terms of the Hydraulic Project Approval issued by WDFW. The purpose of the permit is to address any potential damage or loss of fish and shellfish habitat which is considered to result in direct loss of fish and shellfish production (WDFW 2014). WDFW also has authority over the management of commercial and recreational shellfish harvest and fisheries. Along with tribal governments, they co-manage commercial and recreational finfish and shellfish harvest, and with DNR and the Tribes, they co-manage the wild geoduck

harvest. Additionally, WDFW plays an important role in oil spill response, ballast water monitoring, and Natural Resources Damage Assessment.

Puget Sound Partnership

In 2007, the Legislature established the Puget Sound Partnership (PSP). The Partnership is charged with developing an action agenda to restore the environmental health of Puget Sound by the year 2020. In December 2008, the Partnership released the final Action Agenda. DNR is a member of the Ecosystem Coordination Board that advises the Partnership's Leadership Council. In 2011, the PSP formally approved twenty "dashboard indicators", including twelve natural science measures. The natural science "dashboard indicators" for the long-term recovery of Puget Sound include: marine water quality, freshwater quality, water availability, salmon abundance, Pacific herring, birds, shoreline armoring, eelgrass, toxics in fish, toxics in sediment, and land use/land cover. The social science "dashboard indicators" include: commercial fisheries harvest, swimming beaches, shellfish beds re-opened, and recreational permit sales. Many of these indicators are very applicable to central Puget Sound and the Reserve area.

King County

King County is the primary manager of land and shoreline use through the Comprehensive Land Use Management Plan and Shoreline Master Plan, both updated in 2013. King County is responsible for the regulation of clearing, grading, and construction activities, identification and protection of Critical Areas, providing pollution control though their management of stormwater runoff and their regulation and inspection of onsite septic systems.

King County Parks also manages several natural areas and parks on Vashon-Maury Island that are adjacent to the aquatic reserve, including Dockton County Park, the Maury Island Marine Park and the Maury Island Natural Area.

Local Land-Use Designations

The King County Comprehensive Plan and Shoreline Master Program were updated in 2013 in accordance with the Washington State Shoreline Management Act (WAC-173-26-211). Eight shoreline designations were adopted, five of which fall in or adjacent to the reserve area. The majority of the reserve and adjacent shoreline area is designated as Natural Shoreline, Conservancy Shoreline or Rural Shoreline, and areas waterward of the ordinary high water mark designated as Aquatic Shoreline. Small reaches of shoreline near Portage and Burton are classified as High Intensity Shoreline. Refer to the King County Shoreline Master Program website and the King County Shoreline Master Program iMAP tool for most current information: www5.kingcounty.gov/iMAP/viewer.htm?mapset=shoreline_mp

Shoreline designations found within the reserve (King County Comprehensive Plan 2013):

- *Rural shoreline environment*: Applied to accommodate land uses normally associated with rural area levels of development while providing appropriate public access and recreational uses to the maximum extent practicable
- *Conservancy shoreline environment*: Applied to protect and conserve the shoreline for ecological, public safety, and recreation, purposes. Includes areas with important shoreline ecological processes and functions, valuable historic and cultural features,

flood and geological hazards and recreational opportunities. Residential areas can also be designated as conservancy shorelines.

- *Natural shoreline environments*: Applied to protect those shoreline areas that are relatively free of human influence or have high ecological quality. This designation allows only very low intensity uses in order to maintain the existing high levels of ecological process and function
- *High Intensity shoreline environment*: Applied to areas that provide for high intensity water-oriented commercial and industrial uses
- *Aquatic shoreline environment*: Applied to the areas waterward of the ordinary high water mark

Other classifications:

- *Residential shoreline environment*: Applied to accommodate residential uses at urban densities, while allowing for non-residential uses that are consistent with the protection of the shoreline jurisdiction
- *Resource shoreline environment*: Applied to allow for mining and agriculture land uses, except for shorelines that are relatively intact or that have minimally degraded shoreline processes and functions
- *Forestry shoreline environment*: Applied in areas to allow for forest production and protect municipal water supplies

3. Maury Island Aquatic Reserve

I. Site Characterization

Physical and biological characteristics within and adjacent to the reserve, including physical processes, habitat, species, water and sediment quality, are summarized in the following section. Understanding the components, processes, and functions of the physical and biological communities combined with the social and historical context of Vashon-Maury Island will help guide decisions regarding aquatic land management that influence the reserve and its associated ecological relationships.

Natural resource descriptions have benefited from environmental assessments, studies, and research completed since the 2004 Maury Island Aquatic Reserve Management Plan was adopted. However, there continue to be gaps in scientific understanding and research including the distribution and abundance of many natural resources in the reserve area. Research and monitoring will allow DNR to diminish these gaps and adopt more specific management actions for the reserve that explicitly relate to future desired conditions.

Geographic Context

As part of the Vashon-Maury Island complex, the Maury Island Aquatic Reserve is located in central Puget Sound, and is part of the Puget Trough section of the Willamette Valley-Puget Trough Ecoregion (Floberg et al. 2004). The Puget Trough ecoregion has a diverse and highly fragmented landscape as well as the highest overall land-use change rate of all the ecoregions studied in the western United States. It is the state's busiest transportation corridor, both on land and in water. Much of the original vegetation has been removed by logging, agriculture, road-building and human settlement. Despite this trend, (along with the isolation of an island setting), Vashon-Maury Island has maintained forest areas and grasslands as the predominant land cover types. Forested areas occupy approximately 73 percent of the island, and grassy areas, including low-density residential development, cover approximately 11 percent of the island (King County 2005). The remainder is covered by county parks, recreational and conservation lands, along with a small amount of commercial and other impermeable surface areas. Land uses include residential, recreational, agricultural, and limited transportation and commercial uses. There is a partially excavated gravel mine near Maury Island Marine Park for on-island-use only. Shellfish harvest, commercial and recreational fishing, hunting, limited upland forestry, and conservation lands, exist within or directly adjacent to the aquatic reserve area.

Physical Description

The Puget Trough is a depression formed by the uplifted Cascade and Coast Range mountains, then further scoured by repeated glaciation. During these glacial episodes of advance and retreat, the characteristic glacial "drift" plain made of gravels, sand, silt, clays, and tills were created filling most of the Puget Sound lowlands. The last glacier receded about 14,000 years ago, leaving valleys flooded with melting sea water and islands of glacial till deposits with overlying outwash gravels deposited, and then scoured. This created a complex of basins, smaller inlets, and numerous islands (Burg 1984). These events shaped Vashon-Maury Island, molding the surrounding terrain into a complex environment influenced by dynamic geomorphology and

physical processes. Connected by a narrow isthmus, Vashon and Maury Islands are technically separated by the relatively long, shallow embayment of Quartermaster Harbor (QMH). The harbor is south facing and extends nearly north-south for about 6 miles and covers approximately 3,050 surface acres (1,234 hectares). Water depths within the more enclosed inner harbor area average about 16 feet MLLW, while in the more open outer harbor, the water depth averages approximately 72 feet MLLW and reaches maximum depths of about 168 feet MLLW (NOAA Chart 18472 1991). Along the eastern shoreline of Maury Island, reaches of prominent steep coastal bluffs composed of erodible gravels, sand, and clay merge to form a continuous stretch of beach from Piner Point to the island's eastern tip at Point Robinson. Major hydrographic features influencing the reserve area are the Puget Sound, Quartermaster Harbor, the Puyallup River, Judd Creek, other creeks, ephemeral streams, and localized springs discharging to the ground surface at the island's perimeter.

Ecosystem Description

Puget Sound is both a deep glacially carved fjord and a large estuary complex. It is generally less saline than the open ocean due to large amounts of freshwater input and the constriction in tidal exchange caused by bathymetric sills and the straits. Situated in the central Puget Sound basin, Vashon-Maury Island is bisected by Quartermaster Harbor with a slender strip of land linking the terrain at the head of the bay. QMH is a regionally significant biological resource area that includes extensive eelgrass (*Zostera marina*) and macroalgae beds, provides spawning habitat for herring, surf smelt, and sand lance, as well as nursery and migratory habitat for salmon. It is a significant wintering ground for marine birds including Western Grebe, Common Loon, Surf Scoter, goldeneyes, mergansers, and several other seabirds. Approximately 60 species of fish, 90 species of birds, several species of marine and terrestrial-based mammals, and a variety of invertebrates use the reserve area. Along the outer shorelines, the reserve includes fringing eelgrass beds, mixed kelp and macroalgae beds, and miles of gravelly beaches banded with sand/ pea gravel areas that support upper intertidal forage fish spawning. Intact feeder bluffs, particularly along more exposed shorelines, are prominent features associated with long, well-functioning drift cells. These bluffs sustain the sediment supply to the beaches and support broad tidal flats in the outer harbor, as well as wide sandy flats and the spit at Point Robinson. Shorelines with intact riparian vegetation are prevalent, stabilizing the soil and supplying large woody debris, shade, nutrients, food, and protection to the resources.

Figure 4: Maury Island Aquatic Reserve from Point Robinson

Ecological Zones

The Maury Island Aquatic Reserve can be divided into three ecological zones, each with differences in the associated natural resources, ecological processes, anthropogenic (human) influence and management needs.

- *Inner Quartermaster Harbor*: The most protected portion of the harbor has more shallow water and indeterminate or very weak currents created by wind and tidal conditions (Turnbeaugh 1975). The subtidal sediments in this area are classified as fine silt/mud, with the mud deposition being thicker than areas in outer QMH (Blau 1975).
- *Outer Quartermaster Harbor*: The delineation between inner and outer harbor is a transitional area between Burton Peninsula and Raab's Lagoon. With the exception of the area around Dockton, the outer harbor has deeper waters, averaging about 72 feet and is influenced by a higher energy regime – greater wave exposure, currents, and circulation. The waters in the inner and outer harbor are slightly warmer, less saline, and have a higher residency time than waters along Maury Island's east shore.
- *Piner Point to Point Robinson Nearshore* (also referred to as the east shore of Maury Island). This reach of shoreline is more exposed to waves and currents, and in areas the shore drops precipitously to a much greater depth transitioning to the deeper waters of the central Puget Sound basin. Sand and gravel bluffs, combined with strong nearshore drift and currents direct sediment movement towards the northeast, supporting the sand spit at Point Robinson.

The following sections describe the primary ecosystem processes, habitats, and species that are found within Maury Island Aquatic Reserve.

Physical Processes

Physical processes most relevant to Vashon-Maury Island include broad scale processes such as geological, glacial, climatic, and oceanographic, plus more local scale processes including wave, tidal and current forces, fluvial processes, and sediment dynamics (movement, erosion, and deposition). Located in the central portion of the Puget Sound (Figure 2), the aquatic reserve area experiences a mid-latitude maritime west coast or modified Mediterranean climate. This includes characteristically cool, wet winters and relatively warm, dry summers (Downing 1983). The Pacific Ocean acts as a temperature moderator, while changing pressure systems determine the overall wind direction. Winds can cause significant variation in water circulation and plankton/flotsum distribution. The winds in QMH are predominantly from the south-southwest, particularly in the summer and may impede surface outflow. Air temperatures rarely reach above 90ºF (32 º C) or fall into the teens in the area. The island is protected from intense winter storms by the Olympic Mountains, which intercept wind coming off the Pacific Ocean and deflect them north through the Straits of Juan de Fuca and south through the Chehalis Gap. In an easterly direction, the Cascade Mountains shield the area from some of the higher summer and lower winter temperatures observed in eastern Washington. From 1961-2012, the annual precipitation over a small geographic area around the reserve averaged 35"-43" per year (King County 2013c).

Oceanographic Processes

The overall general flow pattern in Puget Sound is driven by estuarine circulation with outflow at the surface and oceanic inflow over sills at the bottom (Ebbesmeyer and Cannon 2001). Super-imposed on this general estuarine circulation pattern are wind-driven flows and strong tidal currents. Tidal energies in the Central Basin are relatively strong and the water mixes freely throughout most of the year. However, tidal currents at QMH entrance rarely exceed 50 cm/second and average 20 cm/sec along channel in a north-south direction, but outflow is

constrained during ebb tide by strong northward currents across the mouth (Albertson 2013; King County 2014e).

QMH is subject to wide seasonal fluctuations in both oceanographic and water quality parameters, including salinity, pH, and temperature. This is typical of a shallow Puget Sound embayment with a relatively high ratio of drainage area to receiving waters. However, QMH also has a unique seasonal flushing regime compared to other regional embayments. Most Puget Sound inlets experience slow flush times in late summer and the quickest flushing time in November. The bulk of the freshwater flowing into the Central Puget Sound Basin comes from the Duwamish and Puyallup Rivers. The influence of the Puyallup River, which feeds into Commencement Bay across from the mouth of QMH, creates an additional atypical period of slow flushing in the spring. Snow melt in late spring increases the discharge of the Puyallup River which can create a plume that extends across the Sound. The Puyallup River plume is often visible at the entrance and in outer QMH during high flow periods. Since water movement is primarily northward into the harbor, longer water residency time already occurs in the bay. The slow flushing rate, increased run-off from other inputs, and the aforementioned factors may have contributed to the existing water quality problems in QMH (Albertson 2011).

Along the eastern shore of Maury Island, water depth increases rapidly across moderate to steep slopes to approximately 540 feet (152 meters) in the main channel of southern Central Puget Sound (Battelle et al. 2000). This reach of shoreline is considered semi-protected, with lower wave energy than other locations in the Puget Sound region. The northerly transport of surface waters along the shoreline is believed to concentrate plankton and nutrients along the beach, providing relatively high levels of primary production.

Freshwater Inputs

QMH receives runoff from about 40% of Vashon–Maury Island with the two largest tributaries, Judd Creek and Fisher Creek, representing about half of the fresh surface water inflow to QMH (King County 2013c). Mileta Creek in the mid-harbor is also a significant freshwater input (Anchor Environmental 2004). Freshwater inflow to QMH is at a minimum in late summer (King County 2013c). The numerous smaller streams and seeps that deliver freshwater to Maury Island's east shoreline can have large seasonal effects on habitat conditions; the number of seeps and the amount of water entering the reserve through freshwater seeps is unknown. Seasonal variations drive marked declines in salinity, pH and temperature. Furthermore, during summertime dry seasons, particularly in the inner harbor, stratification increases as freshwater inputs decrease (Williams et al. 2001).

Water Quality

The salinity in the inner and outer harbor varies seasonally due to fluctuation in freshwater inputs in the upper layer of the water column and oceanic input in the lower layers. Salinities throughout the entire water column ranged between 17.31 to 31.82 PSU, with the outer harbor showing the greatest variation due to riverine freshwater input (King County 2014e). Water temperature is also an important seasonal physical characteristic. QMH exhibits dramatic water temperature ranges in both the inner and outer harbor, with the shallow inner harbor having the larger range of 2.5 to 21.2 ^{o}C (36.5 to 70.2 ^{o}F). When water temperature increases, chemical and biological activity increase, while the capacity of water to hold dissolved oxygen (DO) decreases (King County 2014e). Over a 7-year period from 2006-2013, DO levels in QMH fell below the state

marine water quality standard. QMH is currently on the 303(d) list as a Category 5 impaired waterbody for dissolved oxygen. The harbor typically experiences the lowest DO concentrations during late summer/fall. These fluctuations combined with human-caused inputs into the harbor cause further negative impacts to water quality in the harbor such as increases in coliform bacteria, nutrient levels, and other potential contaminants (NORTEC 1984). Higher water temperatures and excess nutrients also can lead to excessive phytoplankton growth and depleted oxygen levels when plankton die and are decomposed by bacteria. In the inner harbor, the early spring phytoplankton bloom takes up nitrates/nitrites in the water column until depleted, often extending for a five month period. The addition of more nutrients during this period can lead to even lower DO levels (King County 2013c, King County 2014e).

QMH also is a documented hotspot for the occurrence of several dinoflagellates, some of which are biotoxins and may contribute to water quality issues that affect shellfish harvest (King County 2014e). In 2012, a few areas throughout the greater Puget Sound, including QMH, reported an appearance of *Alexandrium* spp. Other biotoxins, such as *Pseudo-nitzschia* spp. were common throughout Puget Sound in 2011, with some of the highest cell counts observed in QMH. All sample sites identified the presence of *Dinophysis* spp., with the highest cell abundances detected in QMH and Sequim Bay.

Water quality sampling for fecal coliform is regularly collected by Washington Department of Health for evaluating shellfish harvest status including geoduck tracts. Annual reports have approved status for most of the eastern Maury Island shore area with the exception of approximately 800 meters of the shore zone around Shore Acres. Most of the beaches in QMH are classified as "Prohibited" for shellfish collection with the exception of two areas - around the mouth of Raab's lagoon and approximately 2 km north of Neill Point along the western shoreline of the outer harbor (DOH 2013). Water quality issues are exacerbated by the flow flushing rates of QMH (Albertson 2011).

Littoral Transport/Drift Cells and Feeder Bluffs

Johannessen (2010) found that toe erosion was fairly common along the southwest shore of Vashon Island and on the west and east sides of Maury Island. Additionally, landslides commonly occur along the steep bluffs of Vashon-Maury Island. Johannessen also found that Exceptional Feeder Bluff segments (those with the highest sediment input into the nearshore) are located on Maury and southwest Vashon Island. In fact, feeder bluffs are more prevalent along the shores of Vashon and Maury islands as a result of a lesser extent of shoreline armoring (Johannessen 2010).

The littoral drift cells have been mapped and analyzed throughout the Puget Sound, and in the Maury Island Aquatic Reserve there are 16 individual drift cells (Johannessen and MacLennan 2007). A map showing drift cell and feeder bluffs contributing to the reserve area is shown in Figure B-6, Appendix B.

The general pattern of littoral transport in the region largely reflects the shore orientation relative to the predominant wind and wave conditions. The prevailing southwest winds hit the southern shores of Vashon-Maury Island and develop northward drift cells along the shoreline of Maury Island and the southern reaches of QMH. However, there are local reversals of transport and convergence zones within the harbor where fine sediments are deposited in coves and

embayments (Schwartz et al. 1991). Nearshore drift has been significantly altered in several locations within QMH; for example, the dike across the mouth of Raab's Lagoon allows for tidal exchange, but nearshore drift is negligible in the lagoon. Longer reaches around QMH have been impacted by shoreline development and extensive shoreline armoring. Modification has led to changes in the local hydrology, microclimate, interrupted sediment-transport processes, and potentially to habitat types such as saltmarsh, mud flats, and eelgrass. Particularly in the inner harbor, shoreline alteration has adversely influenced tidelands and bedlands. Ramps, docks and piers can also impact water and sediment movement. In addition to two public boat launches, seventeen private ramps have been identified within the reserve. Aerial photos show 84 overwater structures within and adjacent to the reserve that can affect intertidal and shallow subtidal areas. Shading from these structures could impact a minimum of 3.22 acres of habitat (Anchor Environmental 2004).

In contrast, the minimally developed backshore areas and bluffs along the eastern outer shoreline of the reserve feed sediment and detritus along one uninterrupted transport zone terminating at the depositional promontory of Point Robinson. Eddies created at the point by cell convergence create upwelling and provide rich feeding opportunities for numerous species. This relatively undeveloped drift cell, among the longest found in Puget Sound, is becoming a rare feature (Johannessen 2010). The drift cell includes King County's Maury Island Natural Area, with nearly a mile stretch of undeveloped shoreline, and Maury Island Marine Park. These two public holdings represent the longest extent of protected marine shoreline in all of Puget Sound (King County 2013b). This type of well-placed conservation acquisition is a fundamental value and conservation target for this reserve.

Habitat

Habitat characteristics and associated communities in the reserve area are influenced by the complex suite of physical, chemical and biological interactions with the structure of shorelines, intertidal areas, and benthic substratum. The unique oceanographic and tidal regime processes and resources, along with areas of minimal development, provide the sustenance for productive habitat areas. The reserve vicinity provides varied and complex habitat areas, supporting a high level of biodiversity and species richness.

High habitat value includes:

- Nursery and feeding areas for migrating, breeding, nesting, and foraging birds, fish and marine mammals
- Essential habitat types for juvenile salmonids such as small estuaries and embayments
- Nutrient rich and diverse shallow, deep, and open water habitat
- Stretches of minimally disturbed beaches with nourishing feeder bluffs and drift cells with intact riparian vegetation
- Unique oceanographic/fluvial influence affecting both the salinity and residency time of water in QMH and flow along the eastern shore of Maury Island

Key indicators of nearshore marine habitat include but are not limited to:

- Eelgrass, macroalgae and other marine vegetation such as emergent salt marsh

- Forage fish spawning habitat
- Seabirds, marine mammals
- Invertebrates such as clams and crabs

Indicators provide information and documentation of ecosystem health. The Puget Sound Partnership has adopted eelgrass (*Zostera marina*) presence, the reopening of shellfish beds, and herring as a few of the first "dashboard indicators" of nearshore health.

Beaches and Intertidal Habitats

The general shore types found throughout this region include bluff-backed beaches, depositional beaches, deltaic shores, and spits associated with protected lagoons and saltmarshes. The most prevalent of these shore types towards the south and along the eastern Maury Island shoreline are bluff-backed beaches, fronted by relatively narrow, gently sloped, mixed sand and gravel beaches. A few beach areas include coarser gravel/cobble substrate with occasional large glacial erratics (large boulders deposited by glaciers). In this area of Puget Sound, aside from spits and other types of depositional shoreforms, the beaches often have a thin veneer of sediment atop a relatively flat erosional platform (Shipman 1995). The shore areas that are more exposed or affected by currents, periodically reveal the underlying hardpan on the beachfac such as the vicinity just north of Point Robinson and around Neill Point. This compacted hard clay, some with embedded gravels, can provide structure for lower intertidal seaweeds such as large bladed kelps or benthic organisms like *Zirfea pilsbryii*, the burrowing clam, as well as refuge and nesting structure for fish.

Figure 5: Exposed hardpan at Neill Point

Sand and mudflats are also a common shoreform in the reserve, towards the terminal end of drift cells, and in more protected, low energy areas. These tidal flats provide refuge and foraging grounds for birds, fish, a plethora of invertebrates, as well as feeding areas for otters, raccoons and other terrestrial species. Mud and sandflat communities are vulnerable to damage from grounded floating structures, changes in substrate composition due to shoreline armoring or intrusive structures, increased nutrient and sediment loads, and invasion by non-native species (i.e. *Spartina* sp.). A few small estuaries at the mouths of Judd Creek, Fisher Creek, Mileta Creek and Raab's Lagoon serve as transition zones between the freshwater surface flows and the marine waters. These estuaries and the lagoon are rimmed with estuarine emergent marsh vegetation such as *Carex lyngbeii, Salicornia, Jaumea,* and *Distychilis.* These sites are of particular importance as refuge and foraging habitat for juvenile salmonids and many species of birds, other fishes, and mammals. They also provide a source of detritus and nutrients.

Aquatic Vegetation

Eelgrass and Macroalgae

The presence of eelgrass beds distributed throughout intertidal areas in the reserve make this site an important area for juvenile salmonids, forage fish, and a variety of birds and mammals. As a key element in Puget Sound food webs, eelgrass also supports an assortment of other organisms,

including zooplankton, small crabs, nudibranchs, snails, other epiflora and fauna, larval forage fish (e.g., herring), and other small fishes such as pipefish, perch, and gunnels. The Puget Sound Partnership identified eelgrass as an important indicator of ecosystem health in Puget Sound and developed a recovery target of 20% increase in eelgrass by 2020 relative to the 2000-2008 baseline period. Restoring the historic extent of eelgrass in Puget Sound is a DNR priority and an eelgrass recovery strategy is currently being developed that includes eelgrass transplant suitability modelling. Despite evidence of loss, preliminary modelling has identified QMH as a potential site for eelgrass restoration opportunities. Water quality issues in QMH would need to be examined and evaluated before any restoration could take place.

Figure 6: PSC and Aquatic Reserves staff completing SeagrassNet surveys at Neill Point

Eelgrass is found throughout the site in small patches and patchy or continuous fringing beds in the lower intertidal and shallow subtidal zones. The 2001 ShoreZone dataset shows continuous or patchy eelgrass beds offshore for 78 percent (18.65 of 23.88 miles) of the shoreline within the aquatic reserve. In 2004, eelgrass observations in QMH suggested that the distribution and abundance of eelgrass had changed significantly in the past thirty years. From 2004 - 2013 the DNR Submerged Vegetation Monitoring Program (SVMP) monitored 15 sites in the Maury Island Aquatic Reserve and has found eelgrass at seven sites, and at depths ranging from an extreme minimum depth of +5.25 feet (1.6 meters) to an extreme maximum depth of –24 feet (7.3 meters) MLLW. This work augmented SVMP data from previous surveys, and updated the spatial distribution, areal coverage, and average depth and depth range in the reserve area. The 2009 report, stated from the sites surveyed with native eelgrass, the mean eelgrass depth range is from 0 feet to minus 17.4 feet MLLW (Berry et al. 2003; Gaeckle 2009). In 2013, the SVMP group revisited a large site at the north end of the inner harbor that was first monitored in 2004. Preliminary analysis shows that in comparison to the 2004 data, there has been a significant decline in native eelgrass area, and the total disappearance of *Z. japonica* (Ferrier, pers.comm. 2014).

In 2013, as part of the QMH Mooring Buoy Management Plan, a review of herring spawning areas and eelgrass presence was undertaken (Randlette 2013). This qualitative review evaluated the status and distribution of eelgrass and macroalgae, and the co-existing Pacific herring's spawn status in inner QMH, targeting areas in Burton Cove and Dockton. The review evaluated WDFW herring spawning data which includes descriptions of depth distribution, vegetation or substrate types present, and presence of spawn, including a qualitative amount of spawn on the substrate type collected (Stick 2012; Stick et al. 2014).

The data indicates considerable variability in eelgrass distribution over time, with eelgrass gradually diminishing in the inner portion of Burton Cove over the thirty year period (1981 – 2011). By 2010, eelgrass had totally disappeared from the north side of Burton Cove to the mouth of Judd Creek and on the south side of Burton Cove as well, until it turns and opens up to the east. Other spawning substrates, including red and brown algae, worm tubes, hydroids, and terrestrial debris, take the place of the eelgrass for spawning structure. However, the distribution of macroalgae in Burton Cove also changed over this time period. In the Dockton area, the herring spawn and vegetation data is not as clear-cut as in Burton Cove. Nevertheless, there is a trend toward more numerous, but more dispersed eelgrass patches and an overall diminishing amount of submerged aquatic vegetation (Randlette 2013). See Figure B-9, Appendix B.

Several species of macroalgae are prevalent throughout the reserve site, consisting of a variety of mixed brown, red, and green seaweeds. These seaweed communities provide many of the same habitat functions as eelgrass, including spawning substrate for herring. *Gracilaria* and *Graciliariopsis* spp. are notable red algae for herring spawning deposits. On many beaches, hardy macroalgae, such as *Fucus* sp. (rockweed) and *Mastocarpus* spp., are common throughout the intertidal zone where the substrate allows. Green algae (*Ulva* spp.) are seasonally pervasive on the beaches throughout the reserve, and where freshwater drainages or seepages enter the intertidal, *Enteromorpha* spp. is common.

Kelp, a common family of large bladed brown macroalgae, occurs in lower intertidal areas in the reserve; but is more common in shallow subtidal areas with the appropriate substrate. Unlike eelgrass, that actually roots in the sediments, kelp anchors to firm or rocky substrates. Similar to eelgrass, kelp serves to decrease erosion impacts from waves and currents on nearshore environments. It also provides important habitat for a number of fishes and invertebrates, along with a variety of other smaller macroalgae. In QMH, although not prolific, herring spawn surveys documented several species of non-floating kelp and a few species, such as Sugar kelp (*Saccharina latissima*) and *Alaria marginata*, provide substrate for spawn.

Historically, continuous beds of *Nereocystis luetkeana* (floating bull kelp) persisted along the southern and eastern shores of the reserve. These beds were documented over a century ago and mostly disappeared in the early 1900s. One large bull kelp bed off Neill Point was last documented sometime before 1989 and has since disappeared (Blau 1975). Although, bull kelp was once common in many locations just off shore in the reserve, present day, it is conspicuously absent throughout the reserve area (Berry, pers. comm. 2014). For example, in late May 2014, a dense *Sargassum muticum* bed was present off Neill Point.

Subtidal Habitat

This zone encompasses from extreme low water at -4.5 ft. MLLW in this region, to the limits of the photic zone, which is approximated at 65 ft. MLLW for Puget Sound. However, in 2000 and 2002, Battelle estimated a maximum euphotic zone off the eastern shore of Maury Island at minus 46.9 ft. MLLW (Battelle 2003). This can be used to establish a baseline to better approximate the euphotic zone and the potential extent of the vegetated habitat along the outer portion of the reserve. Many of the same physical characteristics and vegetation types of the lower intertidal zone extend and proliferate into shallow subtidal areas, particularly eelgrass and macroalgae. The substrates in this zone are not often exposed to wind-driven energy and are

dominated by mixed fine sediments with silts and muds in the more enclosed, protected embayments, such as inner QMH and Raab's Lagoon. In some shallower areas of the outer harbor, and outer shorelines, sand is the dominant substrate (King County 2009). Most of the actual reserve area is located in the subtidal zone.

Open Water Habitat

Within and adjacent to the reserve, the open water areas serve as a major migratory corridor for marine mammals, fish and bird species, supports feeding and propagation, and acts as a sink for nutrients and a thermal buffer for nearshore waters. Other key physical properties provided by these areas are more constant temperatures, reduced salinity variation, and floatation for a wide variety of animals and plants. Vast numbers of planktonic plants and animals offer an abundant food source and are the foundation for a complex and highly productive food web for a myriad of other species. Many of the open water animals regularly observed feeding, resting, or migrating through the reserve area include a variety of birds, forage fish, salmonids, squid, jellyfish, loons, harbor seals, Northern (Stellar) sea lions, and whales. The reserve area outer boundary approximates 70 ft. MLLW or one half mile from shore. Therefore, deepwater marine habitat is not included in this discussion since it is outside the boundaries of the reserve.

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 migratory and resident birds, fish, and marine mammals, and abundant marine invertebrate species. The variety of aquatic vegetation types, a sizeable sheltered embayment, diverse substrates, and areas of unperturbed physical and ecological processes within the upland-marine interface provide for productive and well utilized habitat areas. Wintering grounds for marine birds and herring spawning grounds of the quality found within the reserve are unique within the central Puget Sound sub-basin. The occurrence of marine mammals, particularly Orca whales, also highlights this site as an area of special interest in central Puget Sound. Regionally important habitats for fish species or populations of interest within the reserve include: forage fish spawning grounds, including herring, surf smelt and Pacific sand lance; salmonid (i.e., Chinook, coho, chum, steelhead, cutthroat) rearing areas and migratory corridors and bottom fish rearing habitat. While fish and wildlife populations have not been thoroughly inventoried, the reserve appears to support a high level of biodiversity, particularly when compared to urban bays in central Puget Sound (Gibson et al. 2000).

Birds

The reserve area offers the protected refuge of QMH for several species of migratory, wintering and resident marine birds. The extensive submerged and riparian vegetation, plus three species of forage fish that spawn and rear in the nearshore areas make this an ideal site for wintering water birds. Aside from specific areas with substantial human development (i.e., Gold Beach, Sandy Shores, Dockton, and Burton), many areas adjacent to the aquatic reserve have largely intact riparian habitat that supports a number of seasonal and resident bird populations. In addition to being sheltered and relatively undisturbed by boat traffic, the site offers a plentiful food supply for water birds including forage fish, juvenile salmonids, shellfish, and other invertebrates. Species lists, see Appendix A, for the reserve area suggest numerous bird species associated with marine or shoreline habitats are found around the islands (Blau 1975). The highest occurrences

and diversity of bird species are found in QMH during winter and occur at much lower levels or are absent during the rest of the year.

A significant decline in many of the populations of marine birds occurred in Puget Sound from 1980 to 2002 and appears to be continuing to the present (Nysewander et. al. 2003; Evenson, pers. comm. 2013). Vashon bird populations seem to be faring a little better, but still face a serious challenge based on the threats outlined in the research by Nysewander et al (Swan 2013). WDFW winter surveys between 1993 and 2013 identify American Widgeon, Surf and White-winged Scoters, Common and Barrow's Goldeneye, Bufflehead, Western Grebes, Black Brant and several species of gulls as the most common wintering marine birds in the area. Of these, scientists use three specific marine birds as indicators of environmental health: Surf Scoters, Western Grebes and Pigeon Guillemots. These birds have been prevalent in QMH in winter months and concentrated in other areas throughout the reserve (Evenson, pers. comm. 2013).

Western Grebes, Surf Scoters, and Pigeon Guillemots

Western Grebes *(Aechmophorus occidentalis)* prefer to winter in sheltered, ice-free waters with large supplies of forage fish, which makes QMH an ideal winter habitat. All grebe species wintering in Washington marine waters have exhibited some degree of decline over the last two decades, but Western Grebes have declined most sharply (Evenson et al. 2010). A study reviewing 36 years of Audubon Christmas Bird Count data, from 1995 to 2010 shows a 95% decline in Western Grebe populations in the Salish Sea (Wilson et al. 2013). QMH supports approximately 8% of Washington's wintering Western Grebe population, which led the Audubon Society of Washington to designate QMH as an Important Bird Area (IBA) (Cullinan 2001). In addition to grebes, the area has provided winter refuge for approximately 3,000 individuals from 35 species of aquatic birds annually (Cullinan 2001). Density indices for all of the inner marine waters of Washington, from the Puget Sound Ecosystem Monitoring Program's winter monitoring efforts from 1992-2008, suggest that this species is still declining.

Puget Sound once attracted some of the largest wintering scoter populations on the West Coast. But since 1995, scoter populations have declined. The Puget Sound Ecosystem Monitoring Program show a continued, significant, approximately 50 percent decline in the region (Evenson, pers. comm. 2013). The cause remains unknown. However, Surf Scoter data from Christmas Bird counts for Vashon, depict a steady population from 1999-2013 (Trevathan 1999-2013 from Swan 2013).

Pigeon Guillemots remain the second most abundant seabird in Puget Sound. They are an important indicator of overall ecological health. As generalists, they forage on a wide range of food across a variety of habitats. They do not appear to have declined as severely as Surf Scoters and Western Grebes, although only limited trend data exists on this species. Recent data from the Puget Sound Ecosystem and Monitoring Program suggest a stable or only a modest decline in guillemot populations. They nest in the bluffs along the backshore areas of Maury Island (Swan 2013).

Other Bird Species of Concern

The Great Blue Heron feeds in shallow waters of QMH and eastern Maury Island. Due to their dependence on trees for nesting, the species is sensitive to riparian vegetation clearing, particularly near eelgrass beds. WDFW has noted an apparent decline in the species and is

monitoring populations. Marbled Murrelets are listed as a threatened species under the Federal Endangered Species Act and on the Washington State species of concern list. The species primarily feeds on small fish, such as sand lance, smelt, and herring, which makes the waters around the reserve area a suitable foraging location for these birds. There have been reported sightings of Marbled Murrelets in the vicinity of Point Robinson. There is no information regarding abundance or frequency of use for this species in this area. In addition to the species described above, there are a number of other species of grebes, scoters, cormorants, sea ducks, geese, loons, and gulls that use the reserve area, some of which are included on the Washington State species of concern list (see Appendix A for species list).

Fish

A variety of recreationally and commercially important fish species inhabit, migrate through, and spawn within the aquatic reserve area (Miller and Borton 1980). However, many of these fish species do not occur continuously, or even frequently within the reserve (Blau 1975). QMH has supported a limited commercial fishery for Pacific herring (*Clupea harengus pallasi*), pile perch (*Rhacochilus vacca*), and surf smelt (*Hypomesus pretiosus*) (NORTEC 1984). These fisheries have declined from their historic highs, and commercial fishing no longer occurs in QMH.

Several studies assessing the health of Commencement and Elliott bays have sampled QMH as a control site (e.g., Malins et al. 1997; Gibson et al. 2000). Compared to the more developed urban bays, samples from QMH contained a lower abundance of fish, however these samples contained significantly more species and more biomass (Gibson et al. 2000). Additionally, almost every fish species found in both the urban bays and QMH were significantly larger within the harbor. These studies also identified sensitive species that are more common or significantly larger in the reference area (QMH) than in the urban bays. These species include: Spiny dogfish, spotted ratfish, longnose skate, rock sole, starry flounder, speckled sanddab, surfperch, pile and striped perch, bay goby, blackbelly eelpout, bay pipefish, and plainfin midshipman (Gibson et al. 2000). These findings support the historical records of the largest pile perch (3 pounds, 9 ounces) and striped surfperch (2 pounds, 1 ounce) caught in Washington State, in QMH in 1980 and 1981 respectively. In 2002, a WDFW bottom trawl of QMH found a high diversity and concentration of flatfish including English sole (*Parophrys vetulus*), speckled sanddab (*Citharichthys stigmaeus*), Pacific sanddab (*Citharichthys sordidus*), and southern rock sole (*Lepidopsetta bilineata*) (Palsson, pers. comm. 2003).

Salmonids

Adult and juvenile salmonids, particularly Chinook, chum, coho, and anadromous cutthroat and steelhead, are documented as occurring in varied habitat areas within the reserve. Juvenile Chinook salmon have been documented using intertidal and shallow subtidal areas along the shorelines of Maury Island and within QMH. The eastern shoreline of Maury Island is an important migratory corridor, as Chinook smolts tend to remain in the shallow nearshore environment as they migrate out of the Puget Sound. Chinook salmon from a number of different regional watersheds rear along the shorelines of Vashon-Maury Island. While Chinook may have been observed in the lower reaches of Judd Creek, Brennan and Higgins suggest that there are no Chinook producing streams or hatchery releases of Chinook on Vashon-Maury Island (2004).

Juvenile and adult chum have been documented using nearshore habitat for rearing, and Judd, Fisher, and Raab's Creek for spawning (Kerwin and Nelson 2000). Wild and hatchery stock coho have also been observed in Judd and Fisher creeks, and coho spawn in Fisher Creek (Grigsby, comment letter 2004; Holtz, pers. comm. 2014). Judd Creek is the only stream adjacent to the reserve that is known to support steelhead, and little is known about abundance or sustainability of this population (Kerwin and Nelson 2000). Several adjacent streams support cutthroat trout and QMH is used by all age classes as a rearing area.

Forage Fish

An abundance of forage fish, including Pacific herring, surf smelt, and Pacific sand lance, utilize spawning habitat areas in the reserve. These fishes are important prey for salmonids and every piscivorous fish, and many marine mammals and seabirds. Pacific herring *(Clupea harengus)* is a pelagic marine species that depends heavily on nearshore habitat vegetated with eelgrass and macroalgae for spawning. Herring spawning grounds and spawning times are well defined and in QMH spawning generally starts mid-January and can extend through to February (WDFW 2000). Herring utilize a variety of marine vegetation and other substrates in intertidal and shallow subtidal zones for spawning. The QMH herring stock is the largest spawning population in the southern/central Puget Sound and among the largest in the entire Puget Sound region.

The documented herring spawning area for the QMH stock historically includes more than 962 acres of habitat and usually occurs from 0.0 to minus 10 feet (0.0 to 3 meters) MLLW. While spawning has been documented throughout QMH and along the eastern shore of Maury Island, spawning activity is variable and typically more concentrated within this larger area (Stick, pers. comm.2013). WDFW has also reported chronic herring spawn mortality in the Dockton area, the cause of which is unknown. In addition to herring spawning sites along the shoreline of QMH and the southeast shoreline of Maury Island, there is a pre-spawner holding area at the mouth of QMH. Herring congregate in this deeper water area prior to migrating to shallower nearshore areas to spawn (Figure B-8, Appendix B).

Surf smelt *(Hypomesus pretiosus)* and Pacific sand lance *(Ammodytes hexapterus)* spawn in extremely shallow water in upper intertidal areas (+5 feet to Mean Higher High Water) on beaches with mixed sand and pea gravel bands. In the reserve area most surf smelt and sand lance spawning occurs between November and February. Beach spawn surveys have been completed during surf smelt and sand lance spawning season (Sept to Feb) from 2010 to 2012. Starting in October 2012, the Aquatic Reserves Program's Puget SoundCorps (PSC) has sampled year-round and confirmed 3 new Pacific sand lance spawning sites, 8 new surf smelt spawning sites, and verified surf smelt spawn in May, which is the first documentation in this area outside of the customarily excepted spawning season. As of July 2014, there is 2,993 ft. of documented Pacific sand lance spawning habitat in the reserve, of which 2,600 ft. were newly documented by the PSC team. Currently, of the 14,504 ft. of documented surf smelt spawning habitat in the reserve vicinity, 3,981 ft. were newly located by the PSC team.

Since surf smelt and sand lance depend on the substrate in upper intertidal areas, they are particularly vulnerable to shoreline modification which can cover or extend into upper intertidal areas or potentially change substrate composition. Documenting spawning habitat areas and

ensuring the protection and availability of suitable spawning habitat is crucial for the conservation of these forage fish populations.

Rockfish

The eastern shore of Maury Island has submerged wrecks and areas with submerged erratics that are capable of supporting rockfish. WDFW, REEF divers, and consultants have documented the presence of several species including copper *(Sebastes caurinus)*, brown *(Sebastes auriculatus)* and Puget Sound *(Sebastes empheus)* rockfishes, as well as other groundfish, such as lingcod *(Ophiodon elongatus)* and red Irish lord *(Hemilepidotus hemilepidotus)* (Palsson, pers. comm. 2003).

Marine Mammals

Both resident and transient species of marine or marine-oriented mammals are found in the vicinity of Vashon-Maury Island throughout the year. These include river otters, harbor seals, California sea lions, killer whales, harbor porpoise and the occasional Steller sea lion, Dall's Porpoise, gray whale, minke whale, and humpback whale.

The southern resident killer whale *(Orcinus orca)* population is listed as a DNR priority marine species and endangered under the federal Endangered Species Act. Killer whales frequent a variety of marine habitats with adequate prey resources and do not appear to be constrained by water depth, temperature, or salinity (Baird 2000). During early autumn, members of southern resident pods expand their routine movements southward into Puget Sound. Whales from the J and K pod are regularly seen along the outer shore of Maury Island, particularly Point Robinson. Transient killer whales are also observed off of Point Robinson. The Whale Trail, a network of whale and wildlife viewing sites along the Puget Sound and Washington coast included Point Robinson as one of its 20 sites (The Whale Trail 2012). Other whales such as, humpback whales, have been observed off the south end of Vashon Island and gray whales have intermittently visited the area including QMH.

Figure 7: Sea stars, *Pisaster ochraceus*, in Maury Island Aquatic Reserve

Invertebrates

The varied habitat areas around the Maury Island site also support an extensive assemblage of invertebrates. In addition to geoduck, several other recreationally harvested species of invertebrates are common in and adjacent to the reserve, such as littleneck, butter, and gaper clams, Dungeness and red rock crab, squid, mussels, octopus and shrimp. Compared to urban bays, samples from QMH contain larger abundances or sizes of 'sensitive species' including several species of sea cucumbers, including spotted sea cucumber and edible sea cucumber (*Parastichopus californica*)(Gibson et al. 2000). A 2002 WDFW bottom trawl in QMH revealed a high abundance of macroinvertebrates including Dungeness crab, red rock crab, several other crab species, unidentified shrimp, red sea cucumber, and various sea stars.

Non-native marine fauna and flora

Monitoring efforts have documented a few non-native species within or adjacent to the aquatic reserve area. *Spartina anglica* was found near the reserve in Raab's Lagoon, Point Heyer, and Tramp Harbor in the late 1990's. Populations near the Maury Island site were small and have responded well to control treatments. In 2012, no *Spartina* infestations were present in the area and these invasions have officially transitioned to "eradicated/monitor" status for Washington State Department of Agriculture (WSDA). WSDA and King County crews currently monitor only once per year during the late summer to verify this status and ensure that no new infestations occur in this vicinity (WSDA 2013).

Other non-native submerged vegetation is present in the reserve area, such as the brown macroalgae, *Sargassum muticum* and *Zostera japonica*. *Z.japonica* was listed as a C-class noxious weed in Washington State in 2012 and is common in several locations within the reserve. Although *Sargassum* is not pervasive in the area, it can compete for space and have a negative impact on the abundance of floating kelp and other large brown algae (Britton-Simmons 2004). Presently, there are no management directives in this particular area for either species (Heimer, pers. comm. 2014).

WDFW currently lists seven species of established non-native tunicates for priority and secondary invasive management (LeClair et al. 2009). Site specific surveys focusing on non-native tunicates have been ongoing since 2007 at four sites within the reserve area. At Dockton, *Diademnum vexillum*, one of the priority species, has been the focus of both experimental control efforts and removal. Efforts for control/removal were implemented in 2007 and several methods have been successful, but control efforts are open-ended. The 1998 Sound-wide survey by Cohen et al. documented several other non-indigenous species near the aquatic reserve. However, no up-to-date, systematic surveys have assessed which species are present adjacent to or in the reserve area.

II. Conservation Targets

Conservation targets are a subset of priority species, habitats or processes designed to represent biodiversity and ecological functions within the reserve. The conservation targets were selected to embody and therefore protect a broader suite of species, habitats, and ecological communities. By conservation targets, management actions can be developed and implemented that are consistent with the protection needs of these priority species and habitats.

During the update process, the Maury Island Aquatic Reserve Implementation Committee identified conservation target candidates from a large suite of species and habitats. This list was refined in consultation with experts and based on the best available knowledge. Some consideration was given to whether a species, habitat or ecological, physical process is currently monitored or could be monitored efficiently and effectively. This ability to monitor the conservation targets, to measure and detect changes that can be linked to other environmental changes, supports adaptive management efforts. Refer to Appendix A for comprehensive observed species lists.

1) Unique ecosystem and geophysical characteristics

a) Relatively intact shoreline processes, erosional bluffs and high functioning drift cells with minimal armoring, such as the uninterrupted drift cell from Piner Point to Point Robinson.

b) Quartermaster Harbor is a regionally significant bay with mudflats, salt marsh, freshwater inputs and eelgrass beds that provide important habitat for forage fish, salmon, wintering migratory seabirds and marine mammals.

c) The reserve includes three distinct ecological zones (inner Quartermaster, outer Quartermaster, and eastern shoreline of Maury Island), which create a gradient of habitats that support a rich biological assemblage of marine invertebrates, salmonids, forage fishes, marine mammals, and wintering seabirds.

2) Aquatic vegetation and habitat

a) Extensive eelgrass beds (*Zostera marina*) and macroalgae, including floating and understory kelps, and emergent saltmarsh vegetation support primary productivity and provide complex habitat for a suite of fish and invertebrates through all life stages; structure for spawning, nursery, refuge and foraging grounds for juvenile and adult fishes and birds.

b) Shorelines with well-nourished sloping beaches, upper intertidal areas with mixed sand and pea gravel, spits, overhanging riparian vegetation, large rocks and boulders, and large woody debris provide important habitat for nesting birds, forage fish spawning, and refuge and foraging grounds for out-migrating juvenile salmon.

3) Bird populations

a) Quartermaster Harbor is an important wintering and migratory water bird area with shallow protected waters, mudflats, and gravelly shoreline that provide abundant food sources. Christmas Bird Counts have documented on average 3,000 waterbirds of approximately 35 species, including grebes, loons, scoters, and sea ducks (Swan 2013).

b) Over 65 bird species regularly utilize the open saltwater, saltmarsh, mudflat, and sand and gravel shoreline habitat in and around the reserve. This includes resident species, such as Pigeon Guillemots, cormorants, Great Blue Heron and Bald Eagles. Pigeon Guillemots can be used as indicators of environmental changes because they are annually monitored and utilize both shoreline and openwater habitat in the reserve.

4) Marine mammal populations

a) Southern Resident killer whales, listed as Endangered under the Endangered Species Act, are sometimes sighted near Point Robinson and along the eastern shore of Maury Island.

Marine mammal species include: California sea lions, harbor seals, killer whales, harbor porpoises, the occasional Stellar sea lion, Dall's Porpoise, gray whales, minke whales, humpback whales and River otters.

5) Fish and Shellfish populations

a) The reserve provides refuge for juvenile salmon and contains Chinook migratory corridors and rearing areas.

b) Forage fish provide a food source for many sea birds, salmon, and marine mammals in the area. Steady sediment supply and nearshore aquatic vegetation provide habitat for Pacific sand lance, surf smelt and Pacific herring spawning. A pre-spawner

herring holding area is located at the mouth of Quartermaster Harbor, extending around Piner Point.

Fish Species include: Chinook, Coho, Chum, Cutthroat, Steelhead, Surf smelt, Pacific sand lance, Pacific herring, Rockfish, Pacific cod, and Lingcod.

Shellfish Species include: Olympia oyster, Dungeness crabs, Red rock crab, native littleneck clams, butter clams, Japanese littleneck clams, and wildstock Geoduck.

III. Archeological, Cultural and Historic Resources

Early History

The first people to inhabit Vashon-Maury Island arrived 10,000-12,000 BP (Years Before Present, "present" being January 1950), and the hunter-gatherer Marpole culture was established 7,000 BP (Clark 2013, Haulman 2006). The Salish culture became a central influence throughout Puget Sound around 1,000 BP (Haulman 2006).

The sx̌ʷəbabš, which means Swiftwater People, also known as the S'Homamish and one of the precursor tribes of the Puyallup Tribe of Indians, inhabited Vashon-Maury Island for 3,000 to 6,000 years until their internment to Fox Island during the Puget Sound Indian Wars in 1855 (Haulman and Cammon Findlay 2011; WSL 2009; Haulman 2008). They established eight permanent villages and multiple gathering spots around Vashon-Maury Island (Tucker and Holtz 2014, Haulman and Cammon Findlay 2011). There are also culturally significant sites at the portage between Vashon and Maury Islands (Larkin 1976).

Fish, shellfish, and marine mammals made up the majority of the sx̌ʷəbabš diet. They burned meadows to promote hunting and growth of edible plants, such as native blackberry, to supplement their diet (Haulman and Cammon Findlay 2011). A clam midden was excavated on the north shore of the Burton Peninsula in 1996. The site had been used as a fish and shellfish drying center between 1000 and 200 years ago, indicated by the presence of fish, mammal and bird bones, stone tools and shells (WSL 2009). The sx̌ʷəbabš culture reached its peak at the end of the 18th century; its population exceeded 650 people before Europeans reached Puget Sound (Haulman and Cammon Findlay 2011).

The first European contact with the sx̌ʷəbabš people was in 1792 when British Captain George Vancouver, searching for the elusive Northwest Passage, named Vashon Island after his friend Captain James Vashon. During the first American exploration of the region in 1841 Maury Island was named by Lieutenant Charles Wilkes, who identified the island as being separate from Vashon. Wilkes named the island after Lt. Williams L. Maury, one of the surveyors on the expedition (VMIHA).

Development

High-grade logging (removing only the most valuable trees) on Vashon-Maury Island began in 1852, and the first homestead claim was made in 1869 (Haulman 2006; Larkin 1976). Farming, fishing and full-scale logging in the 1870's brought permanent settlers to Vashon-Maury (Larkin 1976). Early industries in the area included fishing, logging, brick-making, and shingle-making (Haulman 2006). Steam-powered ships began appearing around Vashon-Maury Island in the

1870's, providing a more efficient way to transport goods produced on the island to markets in Tacoma and Seattle. Several brickyards purchased steamers and steam barges in the 1880's to ferry bricks and workers between Quartermaster Harbor and Tacoma (Haulman 2006). Quartermaster Harbor became a heavily developed area in the 1890's, being home to shipyards, brickyards, farm crop processing plants, a fish cannery, shipping docks, lumberyards, and a shingle mill (Larkin 1976). In 1935 an oyster farm started at Tahlequah with 35,000 Japanese oysters.

Dockton in Quartermaster Harbor was home to the ship-building company Puget Sound Dry Dock from 1892 until the company moved to Seattle in 1909. Pilings from the shipyard and dry dock can still be seen in Quartermaster Harbor. In 1910 the Northwest Canning Company opened a cannery at Dockton; however, it closed after the 1914 Puget Sound salmon peak as the salmon runs declined (VMIHA). In the 1920s, the Dockton Hotel, also known as the Dockton Store or Dockton Store and Post Office, opened and was a center for the Dockton community (VMIHA). It is the only well-preserved building from the early 20th Century on Maury Island, and is registered as a National Historic Place, according to the Washington Information System for Architectural and Archaeological Record (MacIntosh 2000, DAHP 2001, NPS 2014). The building was restored in the 1990s for use as office space (MacIntosh 2000).

Agriculture

Agriculture became an important economic contributor on Vashon-Maury Island from the 1890's to the 1940's. The Island's glacial soil supports crops that need good drainage, such as berries and vegetables (VMIHA). In recent decades, Vashon-Maury has predominately supported small-scale organic, specialty, and subscription farms (VMIHA).

Transportation

To aid in marine navigation, the Point Robinson Fog Signal, a registered National Historic Place according to the Washington Information System for Architectural and Archaeological Record Data, was constructed in 1885 (Haulman 2006, DAHP 2001, NPS 2014). In 1887 a light on a 25-foot pole was added to the fog signal and in 1890 a 25-foot platform was constructed for the light (Haulman 2006). The Point Robinson Lighthouse has been fully automated since 1978 and is now part of Point Robinson Park, as part of a long-term lease from the Coast Guard (Vashon Park District).

Regular daily ferry service did not begin on Vashon-Maury Island until 1889 (Haulman 2006). The first auto ferry reached the island in 1916. Within six years, the Portage-Des Moines ferry was discontinued after ferries began running from the north end of the island to Seattle and from the south end of the island to Tacoma (Haulman 2006). The ferry service was primarily run by the Puget Sound Navigation Company, also known as the Black Ball Line, until 1947 when King County formed the Vashon Ferry District. The Vashon Ferry District operated the ferries until it disbanded in 1951 when the Washington State Ferry System was formed (Stein 2002, Haulman 2006). In 1946, the idea of floating bridges connecting the island to the mainland surfaced, including the beginning of plans by the State Department of Transportation. Initially there was a lot of support for bridging the water; however, the support began to dwindle by 1953. By 1955, the bridge project was put on hold as funds were allocated to the existing ferry system. There was still planning for the construction of bridges to the mainland in the late 1950's, but no action has

been taken to create the bridges (Haulman 2006). In 1992, a public meeting to discuss the possibility of a bridge from Vashon to the mainland was attended by 2,000 islanders against a bridge being built (Stein 2002, Haulman 2006).

Vashon-Maury Island's archeological, cultural and historic resources have been greatly influenced by the Island's physical properties. It's wealth of natural resources allowed it to accommodate permanent settlements of the sx̌ʷəbabš and promoted many of the early industries on the island. However, as an island, Vashon-Maury also provided limited accessibility to settlers and industry, creating distinct transportation needs that dictated much of the development on the island. The influence of the island's history is still felt in the current uses on the island and within the Maury Island Aquatic Reserve.

IV. Current Uses and Impacts

Uses of state-owned aquatic lands take many forms, including marinas, public access sites, utilities, outfalls, moorage, restoration projects and a variety of recreational activities. DNR uses different types of use authorizations (i.e., rights-of-entry, licenses, leases, and easements) to authorize these activities. The proper management of uses within the reserve is a critical component of DNR's overall strategy under WAC 332-30-151(2), which states that "leases for activities in conflict with reserve status shall not be issued."

This section updates the current uses on state-owned aquatic land within and/or adjacent to the reserve. The current Maury Island ecosystem condition is the result of anthropogenic (human caused) change and natural drivers and pressures. Uses described in this section may contribute to degraded conditions, dependent upon the location and design. Appropriate mitigation and/or best management practices are necessary to ensure current uses remain consistent with the goals and objectives of the reserve, particularly if they change over time

Private and Public Land Adjacent to the Aquatic Reserve

Approximately 88 percent of the tidelands in Quartermaster Harbor and the eastern shoreline of Maury Island are privately owned. The majority of uplands adjacent to the aquatic reserve are also privately owned, though there are several areas owned or managed by other public entities. The Vashon Park District leases the Point Robinson Light House from the U.S. Coast Guard, and manages Burton Acres Park. King County owns and manages many sites along the reserve boundary, including the Maury Island Natural Area, Maury Island Marine Park, and Dockton Park. King County also has regulatory jurisdiction over land-use in and adjacent to the aquatic reserve through the County's Shoreline Master Program and Comprehensive Land Use Plan.

The DNR does not have proprietary authority over aquatic lands and uplands that are not owned by the State of Washington. However, DNR has identified activities, such as shoreline modifications and nonpoint source pollution, which occur on privately owned aquatic lands and uplands adjacent to the reserve that may impact habitats and species identified for conservation in the reserve (Broadhurst 1998). Therefore, the successful conservation of critical habitats and species in and adjacent to the aquatic reserve will be enhanced by partnerships, as well as voluntary stewardship activities undertaken by shoreline property owners.

Cable Crossings (Telecommunications and Power lines)

There are currently several cable use authorizations crossing the tidelands adjacent to Maury Island. Puget Sound Energy has two right-of-way agreements (#51-027510, #51-021507) for power and telecommunication cables, and Comcast has a right-of-way agreement for a submarine fiber optic cable. Both cables cross the aquatic reserve at Luana Beach on the northeast shore of Maury Island. The authorization of the use of these state-owned aquatic lands is valid in perpetuity. The existing utilities are static in the environment and pose no noticeable impacts to existing habitats. The cables have an associated right-of-way restricting certain uses surrounding the cable to protect it from damage. The management provisions have not changed. Refer to Appendix D for a list of use authorizations.

Wildstock Geoduck Harvest

The Washington Department of Natural Resources, the Washington Department of Fish and Wildlife (WDFW), and the Puget Sound Treaty Indian Tribes (Tribes) jointly manage the wildstock geoduck fishery in Washington State. The State and the Tribes are responsible for estimating geoduck population size, determining sustainable yield, establishing annual harvest rates, and ensuring adverse effects to the environment from harvest practices are minimized. Treaty fishing rights require a 50/50 split of the geoduck resources between the state and Treaty Tribes. The DNR has proprietary management interest in the State's half of the harvest and auctions the right to harvest the wildstock geoduck to the private sector. Management of the geoduck resource is dynamic due to changes in market demand, and new information on geoduck biology and population dynamics (DNR 2008). Commercial harvest typically only extends between -18 and -70ft contours. There is one active, two inactive, and two in-recovery geoduck tracts within the reserve; see Appendix B map of geoduck tracts in the reserve area.

The largest impact of the wildstock geoduck fishery is the removal of a large sessile biomass. Natural geoduck stock recovery is thought to take an average of about 40 years (DNR 2008). Harvest agreements between the State and Treaty Tribes require that harvest must not impact native aquatic vegetation, forage fish spawning or forage fish spawning habitat.

Recreational Shellfish Harvest

Currently, recreational shellfish harvest within the reserve is limited. All public clam and oyster beaches within the reserve are closed to butter and varnish clam harvesting, while Dockton County Park is closed for all species (DOH 2014). There is the potential for recreational shellfish harvesting to expand to include butter and varnish clams, and other currently closed species at specific locations. This could lead to impacts on native aquatic vegetation, forage fish spawning or forage fish spawning habitat.

Overwater Structures

The following sections include all overwater structures including marinas and public docks, private docks, floats, buoys, anchoring and moorage. Each of these uses provides public benefits and also potential to adversely affect resources of the reserve. In many cases DNR habitat stewardship measures, such as replacing creosote with nontoxic pilings, helical screw anchors, and grated decking, significantly reduce impacts to aquatic habitats from these structures. DNR's goal is to work with tenants to reduce site-specific adverse impacts over the long term.

Marinas, Public Docks and Boat Launches

Marinas and public docks provide moorage facilities for commercial or recreational vessels. There are three marinas and two public boat launch in the Maury Island Reserve Area. Typically, marinas are comprised of a series of docks or moorage areas used for transient or permanent vessel moorage. These facilities can include other services such as sewage waste pump-out, fueling facilities, vessel maintenance/repair, upland storage, or upland parking and residential use. Marinas provide important public access for a variety of watercraft and important regional recreational opportunities.

Marinas and public docks have the potential to affect water quality and may result in sediment contamination (caused by the use of toxic materials, such as creosote). Pilings and bulkheads can cause major disruptions to aquatic habitat. Docks, pilings and bulkheads can change wave and sediment patterns, leading to the loss of sand and beaches. Marinas and public docks can also cause shading, resulting in changes to the euphotic zone and associated primary production, including impacts to aquatic vegetation. DNR recognizes the need for well-functioning and publicly accessible boat waste pump-out facilities in Quartermaster Harbor. DNR habitat stewardship measure are designed to minimize these impacts and DNR will work with lessees to reduce potential impacts.

Quartermaster Harbor Marina

The Quartermaster Harbor Marina, owned and operated by Polaris Development, LLC, is under a DNR lease for the use of 3.09 acres of state-owned aquatic lands. The marina consists of approximately 90 slips. Sediment surveys conducted in 1992 found that the sediments in the area are relatively clean. The current lease expires in 2036.

Quartermaster Yacht Club

The Quartermaster Yacht Club is a non-profit organization that provides private boat mooring. The yacht club has approximately 100 slips, dock space for club members and reciprocal moorage for members visiting from other yacht clubs. The current lease of the yacht club expires in 2043.

Dockton Public Pier and Boat Dock (King County)

Dockton Park has a pier composed of wood and concrete, primarily suspended by wooden piles, with a wooden deck on styrofoam floats for the mooring slips. There is a concrete seawall along the shoreline of the majority of the park. The park also includes a public boat launch. King County and DNR created an interagency agreement for the use of 0.81 acres of state-owned aquatic lands for the Dockton public pier and dock, which expires in 2033. The boat dock provides approximately 40 mooring slips and dock space in the short-stay marina, public showers and restrooms, picnic area, parking, and boat ramp.

The Dockton Park dock and moorage is considered an existing use within the reserve, and DNR will work cooperatively with the lessee to develop a site plan that meets the management plan criteria. The moorage service of the marina supports the reserve by reducing impacts to the habitats and species caused by anchoring within the harbor.

Burton Acres Park

Vashon Park District owns the Burton Acres Park, and has sold the Vashon Kayak Center at Jensen Point on Burton Peninsula to a private business, Vashon Watersports. The site includes a rowing club boat house, public parking area, and public no-fee boat ramp that provides access for boaters to row out to vessels moored nearby.

Recreational Docks, Floats and Buoys, Anchoring and Moorage

Numerous recreational floats, docks and mooring buoys exist within the reserve. These structures are important aspects of island living for local residents because they provide moorage for recreational vessels and local access to the aquatic resources of the area. These structures can serve a vital role in facilitating and promoting appropriate public use and access and in decreasing impacts caused by anchoring within the reserve. Two areas of concern are addressed within the reserve boundaries – overwater structures and appropriate moorage.

Aerial photos show 84 overwater structures within or adjacent to the reserve that shade a minimum of 3.22 acres of habitat (Anchor Environmental 2004). Most of these structures are associated with single-family residences and many are located partially on private tidelands. If not properly installed, recreational docks and floats may cause the same types of negative impacts as those related to marinas and public docks, such as shading, impacts to water quality, sediment contamination, hydrologic alterations, use of toxic materials (such as materials treated with creosote), and provide refuge to enhance opportunities for predation. Refer to Appendix B for a map of overwater structures.

Recreational mooring buoys may cause scouring of aquatic vegetation and other substrate. When mooring a boat, the potential impacts, if any, are dependent upon:

- Anchor and buoy system used (mooring system)
- Length of stay
- Choice of covered or un-covered moorage

Figure 8: Quartermaster Harbor, near Dockton

For example, boats that moor for extended periods of time (length of stay) may have their hulls painted with a biocide to restrict growth of marine organisms. In addition, numerous buoys congregated in one area create the potential for shading of aquatic vegetation and discharge impacts associated with the moored vessels. If properly installed, these impacts may be minor or eliminated.

The Quartermaster Harbor Mooring Buoy Plan (Randlette 2013), available at http://www.dnr.wa.gov/Publications/aqr_quartermaster_harbor_mooring_buoy_plan.pdf) estimates 274 permanently installed recreational mooring buoys and rafts are located throughout Quartermaster Harbor alone. Of these, approximately 187 buoys and rafts currently are anchored on state-owned aquatic lands, with the majority congregated in Burton Cove and Dockton. The

remaining 87 mooring buoys are on private tidelands, fronting the associated residential waterfront. Most existing buoys on state-owned aquatic lands have not been authorized by DNR and in some cases vessels have been abandoned and pose a risk to boaters (Randlette 2013). It has not been determined whether a full survey of mooring systems on state-owned aquatic lands in other areas of the Maury Island Aquatic Reserve is warranted.

Mooring systems use an anchor, float or buoy, and a tether. While DNR prefers a mid-line float design for a mooring buoy system, and encourages helical screw or other approved embedded anchors, this design may not be appropriate for all environmental situations within the reserve boundaries.

Moorage provided by marinas is covered under WAC 332-30-139, and identifies the design requirements for moorage facilities on state-owned aquatic lands, including open and covered moorage, enclosed moorage, the use of breakwaters and requirements for upland sewage disposal.

Shoreline Modification

Shoreline modification can disrupt natural sedimentation, organic matter accumulation and freshwater inputs that are important for maintaining coastal habitat formation and function. Shoreline modification includes bulkheads, filling, diking, moorage, outfalls, overwater structures and ramps. An estimated 13.75 miles or 57.6 percent of the shoreline within the reserve has been hardened or modified (Nearshore Habitat Program 2001).

A 2014 King County study examined shoreline modification change since 2005, associated affects, and the rates of compliance for obtaining the proper permits before construction or modification of shoreline structures. The study found that a substantial number of new shoreline construction and repairs of existing structures was not properly permitted. Notably, a new 292 foot long, unpermitted bulkhead was constructed near Neill Point at the toe of a feeder bluff and could impact drift cell function (King County 2014f).

Stormwater Outfalls and Nonpoint Source Pollution

There are three commercial and three residential stormwater outfalls documented in the King County iMAP tool in the reserve vicinity – four around QMH and two near Piner Point (King County iMAP tool; accessed 12/22/14). They do not appear to discharge directly into marine waters, however, the stormwater eventually drains into marine waters.

Stormwater is the portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of a stormwater drainage system into a defined surface waterbody or infiltration facility (DOE 2012). When stormwater is absorbed into the ground, it can be filtered by sediment and may ultimately replenish aquifers or flow into streams and rivers. This is important to island communities such as Vashon-Maury where the sole source of drinking water is rainwater-supplied aquifers (King County 2014d). Impervious surfaces can prevent precipitation from being absorbed into the ground; instead, water flows into storm drains, drainage ditches or directly into water bodies. There are concentrations of impervious surfaces in the Dockton and Burton areas in QMH (Vashon-Maury Watershed Plan 2005). Without proper settling time or treatment, stormwater

may flush considerable quantities of nutrients, toxins, pollutants and sediment into marine waters, which can affect the water quality, flow, chemistry, mixing, and temperature of receiving waters.

Nonpoint sources of pollution are difficult to address because they are diverse in nature and are caused by a variety of sources spread over a relatively large geographic area. The Washington State Department of Ecology defines nonpoint source pollution as "pollution that enters a waterbody from diffuse origins on the watershed and does not result from discernible, confined or discreet conveyances" (DOE 2012). Nonpoint sources of pollution around the reserve can degrade water quality and contribute to a reduction in light penetration therefore inhibiting the growth of eelgrass and other native aquatic vegetation.

Stormwater management and nonpoint source pollution are of particular concern in and around QMH where they are a contributing factor in existing water quality problems. The wastewater treatment plant located on Vashon does not service areas adjacent to Maury Island Aquatic Reserve. Therefore, most residences use onsite septic systems and the effluent may contain contaminants that can be discharged into marine waters by stormwater runoff (King County 2014d). Refer to page 39 for a discussion of the Vashon-Maury Island Marine Recovery Area.

Habitat Restoration and Enhancement

Habitat restoration and enhancement activities are voluntary projects completed outside of any mitigation requirements designed to improve the natural conditions of state-owned aquatic lands. These projects may require regulatory permits, but are not required by regulatory agencies. DNR uses the following definitions for protection, enhancement, and restoration, starting with the assumption that all three use historic habitat as a reference point. If the site is completely degraded to the point that it has lost all of its historic aquatic functions, then the site can only be restored. If a site is degraded but still retains some of its historic aquatic functions, then the site can only be enhanced. And if a site is pristine, by definition, it can only be protected or preserved (the site cannot be enhanced or restored). Given the historic reference point used for the definitions, restoration, enhancement, and protection are mutually exclusive from one another (USACE 2002). Refer to page 40 for a discussion of recent habitat and restoration projects in the reserve area.

During the comment process for the 2014 plan update, DNR learned about the loss of culturally and ecologically significant landmark boulders that were present on the Maury and Vashon shoreline and intertidal zone prior to being dynamited. There is local interest in restoring these iconic natural features because of their cultural significance and valuable for intertidal habitat. There also could be challenges in permitting a project that may pose hazards to boaters. Nonetheless, all proposals of this nature (i.e. restoring a naturally occurring habitat) deserve serious consideration and research as plan implementation continues.

Public Use and Access

Providing public use to state-owned aquatic lands is one of DNR's primary mandates. To accomplish this mandate, DNR typically authorizes structures and facilities (such as boat ramps, marinas, and public boardwalks) through the issuance of leases or easements. DNR will work cooperatively with lessees to reduce any potential impacts.

Various different types of recreation activities occur in an around Maury Island Aquatic Reserve, the most popular being: hiking, dog walking, horseback riding, bird watching and other nature observation, photography, running, mountain biking and informal picnicking. Illegal activities such as use by off road vehicles and walkers with dogs off leash are known to occur on the site. Depending upon the location, illegal activities could produce adverse impacts on the aquatic habitats and species within the reserve.

While DNR promotes public use through proprietary authorizations, DNR does not have authority to manage many of these public recreational activities such as boating, fishing, shellfish harvest, swimming, and beach walking. Beach walking occurs extensively along the reserve boundary on privately owned and state-owned aquatic tidelands. Recreational clam harvests are known to occur at Burton Acres and Point Robinson parks and likely occur at the other public beaches within the reserve. Boating and fishing are other common activities that occur within the reserve. Reports from local citizens indicate that water-skiing is another favored activity within Quartermaster Harbor due to the relatively calm waters in the area.

Maury Island Marine Park is a relatively new park, and a management plan is being finalized. King County Parks is partnering with Friends of Maury Island Marine Park to install a picnic shelter. This site's tidelands are well-known and highly popular for scuba divers. The Maury Island Marine Park facilitates easy drop off and pick up, and is near other popular dive sites. At the Maury Island Natural Area, the presence of old sunken barges attracts divers to the site, and marine life is plentiful.

Below is a list of public access and recreational areas adjacent to the Reserve:

- Burton Acres and Jenson Point
- Dockton Forest Natural Area
- Dockton Park
- Inspiration Point
- Lost Lake
- Maury Island Marine Park
- Maury Island Natural Area
- Neill Point Natural Area
- Piner Point Natural Area
- Point Robinson Park
- Raab's Lagoon Natural Area

Public access and Recreational Areas Adjacent to Reserve (Source: Vashon-Maury Island Parks and Natural Lands, King County GIS Center, 2013). See Appendix B for a map of parks and natural areas.

Potential Impacts

Oil Spills

The U.S. Coast Guard, the Washington Department of Ecology (DOE) and the maritime industry have necessary procedures and technologies in place to significantly reduce the likelihood of oils spills and minimize spill volume. However, the possibility exists for future spills, which could have a particularly catastrophic impact on the habitats and species found within the aquatic reserve.

The DOE has a Spill Prevention, Preparedness and Response Program that focuses on prevention of oil spills to Washington waters and land, as well as planning for an effective response to any oil and hazardous substance spills that may occur. DOE's Oil Spill Response Plan established

booming strategies to protect sensitive areas throughout Puget Sound. DNR will work with oil spill response partners to make sure the Maury Island Aquatic Reserve is a priority spill response area. DOE's spill program tracks vessel traffic in Washington State and publishes the information in Vessel Entries and Transits for Washington Reports.

Climate Change

Global climate change is likely to impact the Maury Island Aquatic Reserve area if future predictions of sea-level rise (SLR) and increased storm events and flooding occur. 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. The study expects that local SLR in Puget Sound will closely match global SLR (Mote et al. 2008). This rise in sea-level will result in increased coastal erosion, changes in the tidal prism and salinity of embayments and wetland inundation, migration and salinization (Canning 2001).

Ocean Acidification

Ocean acidification is the gradual increase in the acidity of seawater over time. The current rate of carbon emissions from such sources as the burning of fossil fuels, results in increased absorption of carbon dioxide by the ocean. This is compounded by localized nutrient or organic carbon inputs from runoff and land-use changes. There has been a demonstrated decrease in the upper-ocean pH by 0.1 units and this decline is expected to continue, with a predicted decline of 0.3-0.4 pH units by the end of the century (WBRP 2012a). The rate of ocean acidification has accelerated due to anthropogenic carbon emissions and is currently "10 times faster than anything the earth has experienced during the past 50 million years" (WBRP 2012b).

Ocean acidification has the potential to cause significant ecological and economic impacts in Puget Sound. In 2013, the Washington Marine Resources Advisory Council within the Office of the Governor was created to advise on the effects of ocean acidification and provide recommendations based on research by the WA Blue Ribbon Panel on Ocean Acidification. The reduction in seawater pH can interfere with shell and skeleton building by calcifying organisms and is therefore of particular concern for shellfish (WBRP 2012b).

V. Progress

This section details progress made towards meeting Maury Island Aquatic Reserve desired future conditions and plan goals and objectives. Over the past ten years, DNR and partners have completed a variety of projects within and adjacent to the reserve. The purpose of the projects has ranged from meeting specific goals or objectives outlined in the original Maury Island Aquatic Reserve Management Plan, to meeting mandates set in law.

Outfall Program

In 2013, an Outfall Program was developed in the DNR Aquatics Division with full-time staff devoted to outfall planning. This program will provide recommendations on outfall monitoring and stormwater management and will offer support to the Aquatic Reserves Program for nonpoint and point discharges.

Vashon-Maury Island Marine Recovery Area

Under RCW 70.118A, areas where septic systems contribute to marine water quality problems that affect or threaten shellfish harvest must be identified and designated as Marine Recovery Areas (MRA) . Within MRAs management strategies are developed to find and repair all failing onsite septic systems. Seattle and King County-Public Health identified onsite septic systems as a water quality concern in Quartermaster Harbor leading to a MRA designation in 2008 (King County 2013a ; King County 2014g).

The majority of residences adjacent to the reserve treat domestic wastewater with onsite septic systems. Effluent from failing or out of code onsite septic systems may contain a number of contaminants, including nitrate, bacteria, viruses, and trace organic chemical compounds. An Onsite Septic System Management Plan adopted for the Vashon-Maury Island MRA established goals and objectives for addressing septic problems. Implementation is ongoing and includes education and outreach, an inventory of onsite septic systems and identification of septic systems in need of repair (King County 2007b). The King County website (http://www.kingcounty.gov/healthservices/health/ehs/wastewater/mra.aspx) details recent actions, grant opportunities, and workshops aimed at helping landowners improve their on-site septic systems.

Marinas and Public Docks

Marinas and public docks provide moorage facilities for commercial or recreational vessels. Typically, marinas are comprised of a series of docks or moorage areas used for transient or permanent vessel moorage. The marinas and public dock located in QMH have made several improvements guided by DNR habitat stewardship measures, listed in Table 1.

Table 1: Marina and public dock stewardship projects

PROJECT	DESCRIPTION
Quartermaster Harbor Marina	**Completed Improvements:** ▪ Replaced and reconfigured docks ▪ Removed creosote pilings ▪ New floats includes grating with more open space that reduces shading ▪ New pumpout that is free and open to public use ▪ Except for two vessels, boats moored at the site are not to be used as residences.
Quartermaster Yacht Club	**Completed Improvements:** ▪ Replaced floats and installed grated decking with more open space that reduces shading ▪ Replaced creosote pilings with steel pilings ▪ Pumpout on site for members and their guests.
Dockton Park Dock & Moorage	**Proposed Repair/Improvements:** ▪ King County received a grant (RCO, PRISM Project #12-1736) in 2012 to improve the public boating facilities including: – Replace and repair pilings – Install floatation to stabilize dock – Replace steel and wooden cross-bracing on the fixed section of the pier and hinge points on the finger piers – Install new pumpout station

Recreational Docks, Floats and Buoys, Anchoring and Moorage

Quartermaster Harbor Mooring Buoy Management Plan

In response to increasing congestion caused by the mooring conditions within QMH, particularly in, DNR Aquatic Resources Division developed the Quartermaster Harbor Mooring Management Plan (Randlette 2013). Community meetings were held to discuss the need for a coordinated approach to the mooring buoy problem and support was generated through this outreach process. This plan addresses the areas of QMH, particularly Burton Cove, Judd Creek area and Dockton, where high concentrations of unauthorized buoys and floats were documented. Final recommendations include:

- Designate buoy fields in Burton Cove and Dockton.
- Require that boats are moored on embedded anchors with midline floats to reduce the scouring of aquatic vegetation and sediments.
- Streamline the permitting process by allowing DNR to obtain necessary county, state, and federal permits. Boaters will only need to submit one application to DNR, which will include use authorization and the necessary permits.
- Designate a navigational channel at Dockton and include a voluntary, no-anchor area.
- Remove abandoned and derelict buoys.
- Encourage establishment of a public access point in Burton Cove.

The plan will be implemented in two phases:

1. Short-term – Removal of debris from mooring field, obtaining permits, issuing mooring buoy licenses
2. Long-term – Public access, property interests, environmental issues, issuing mooring buoy licenses

Historically, the majority of buoys on state-owned aquatic lands in Quartermaster Harbor were installed without permits or authorization from DNR and the other appropriate agencies with regulatory authority over mooring buoys in the area (King County, Washington Department of Fish & Wildlife, and the US Army Corps of Engineers). DNR now is asking boaters to apply for recreational mooring buoy authorizations, and will issue mooring buoy licenses. The mooring buoy plan seeks to accommodate at least the existing number of vessels currently moored in QMH, particularly in the congested areas of Dockton and Burton Cove. Residential waterfront owners next to state-owned aquatic lands may install recreational mooring buoys on state-owned aquatic lands for no fee, but are required to obtain a license.

Habitat Restoration and Enhancement

King County Stewardship Projects

King County Parks and King County Water and Land Resources Division have coordinated on a number of habitat stewardship projects adjacent to the reserve. These include:

Table 2: King County stewardship projects

PROJECT	DESCRIPTION
Maury Island Marine Park Restoration	▪ Ongoing restoration - invasive vegetation removal and planting of native species ▪ Construction of picnic shelter near beach ▪ Connection to Dockton Park via community trail (dependent on future acquisition)
Maury Island Natural Area Cleanup & Restoration	▪ Site management and park development ▪ Coordinating with DOE on cleanup requirements ▪ Planning removal of remnant pier
Dockton Natural Area Restoration	▪ Removed 100 creosote pilings and 400 ft. of shoreline armoring ▪ Gravels were added to the beach & a new marine inlet was created
Dockton Beach Cleanup	▪ King County is coordinating with DNR and WaDOT to remove shoreline debris on tidelands north of Dockton
Judd Creek Acquisition & Restoration	▪ Removed 2 houses from stream buffer ▪ Stream restoration including native revegetation and installation of large woody debris in Paradise Valley reach ▪ Planning additional wood placement in Judd Creek estuary
Piner Point Natural Area acquisition & restorations	▪ Addition of 6 more acres and 417 ft. of shoreline to this Natural Area ▪ Plans for future shoreline restoration including shoreline armoring removal
Lost Lake to Neill Point Acquisition & Restoration	▪ Plans to acquire parcels in this areas for restoration and preservation including shoreline armoring removal
Point Robinson Restoration	▪ Study to determine feasibility of recreating a historic salt marsh
Raab's Lagoon Restoration	▪ Revegetation of nearly 1000 ft. of shoreline with native plants

Land Acquisition/Transactions for Habitat Conservation

Since the reserve was established, partners have acquired valuable parcels within the boundaries and abutting the reserve for conservation purposes.

Maury Island Natural Area and Marine Park

Maury Island Natural Area is a former gravel mine site that is now a 275-acre open space under the stewardship of King County Parks. The site contains pure Madrone forests and nearshore habitat that supports endangered species such as Chinook salmon, orca, and bull trout. The site's nearly one mile of shoreline is the longest undeveloped stretch of Puget Sound shoreline in King County. The site serves important natural resource functions, including but not limited to benefiting and protecting natural drainage basins, flood control systems, ecological systems, feeder bluffs, nearshore drift cells, water quality, ground water, fisheries and wildlife habitat, and other natural processes. Per King County's Shoreline Management Program, the portion of a Natural Area within 200 feet of the ordinary high water mark is designated a "Natural Environment". The Natural Shoreline designation protects those shoreline areas that are relatively free of human influence or have high ecological quality. This designation allows only very low intensity uses in order to maintain the existing high levels of ecological

Figure 9: Eastern shoreline Maury Island

process and function; only passive and low-impact recreational development are permitted in a Natural Shoreline (King County 2014c).

The 320-acre Maury Island Marine Park, a King County Natural Area since 1995, is located north of Maury Island Natural Area and is another former mine site. Washington Conservation Corps crews have been working on a large restoration project at this site since 2012, clearing blackberries and Scot's broom, and replanting native species, including 63,000 native trees and shrubs in the winter of 2013/14. The restored site will provide a functioning upland ecosystem to support the nearshore ecology of the aquatic reserve. Together, the two King County sites represent the largest public holding of protected marine shoreline in all of Puget Sound. King County and stakeholders are working to identify appropriate site improvements, such as trails, water access, restroom facilities, picnic areas and parking.

King County has also acquired shoreline parcels in west Quartermaster Harbor, Northilla, and Piner Point, increasing the protected natural shorelines and restoration opportunities adjacent to the reserve.

Vashon-Maury Island Land Trust

"The Vashon-Maury Island Land Trust was founded in 1989 by a dedicated group of islanders who were concerned about preserving Vashon and Maury. Since that time, the Land Trust has been instrumental in the acquisition and permanent preservation of over sixteen hundred acres of carefully chosen property on Vashon and Maury" (VMILT 2014). The Vashon-Maury Land Trust has partnered with King County on several land acquisition and restoration projects, and was involved in the conservation of Raab's Lagoon, Inspiration Point, Neill Point, Manzanita, Northilla, Piner Point, the Glacier purchase, and additions to Dockton Park. These sites include shorelines and some tidelands adjacent to the reserve.

Figure 10: PSC collecting forage fish beach spawning samples

Quartermaster Harbor Bush Act

DNR has no dedicated funding to purchase aquatic land. However, DNR does have a reversionary interest in some Bush Act parcels located adjacent to the reserve. The reversionary right[1] for these parcels cannot be sold to private entities and is retained by DNR Aquatics. Two parcels within the Quartermaster Harbor were held in tax title status by King County. DNR chose to exercise its management interest in the reversionary rights to these parcels, and obtain them. The acquisition increased the moorage space availability within Quartermaster Harbor, one in the north-north-west corner of inner Quartermaster Harbor, and the other in the southwest corner of the inner harbor.

DNR has also obtained a conservation easement with Polaris Development, LLC to cover a variety of improvements the Quartermaster Harbor Marina made during a recent upgrade. This

[1] A clause that says if the land ceases to be used for its intended purpose, title will revert to the grantor.

perpetual easement covers four King County tax parcels and restricts the land owner from making any improvements to the parcels.

Research and Monitoring

Data Gap and Baseline Inventory:

Monitoring and research completed in the last 10 years by DNR, King County, local non-profits, citizen science groups and other partners have helped fill data gaps. Monitoring, inventory and research completed in or adjacent to the reserve are listed in Table 3.

Table 3: Research, inventory and monitoring projects

Resource	Baseline work	Dates	Conducted by	Description/Further Work
Water and sediment quality	WRIA 9 Marine shoreline monitoring and compliance project	Ongoing	King County	Marine shoreline habitat conditions monitoring
	PSAMP sediment quality studies		DOE	Long-term monitoring to characterize baseline conditions and identify changes in Puget Sound
	Quartermaster Harbor Nitrogen Loading Study	Final report 2014	King County	Evaluate low dissolved oxygen events in QMH, focus on water quality and identification of nitrogen sources
	Sediment quality – Ephemeral Data Collection Plan	2014-current	DNR, PSC	Sediment quality data used in Natural Resource Damage Assessments in the event of an oil spill
Nearshore drift cells	King County Shoreline Protection and Restoration Plan	2010	King County	Inventory and classification of modified shorelines
	Assessing Littoral Sediment Supply (Feeder Bluffs) and Beach Condition in King and Southern Snohomish Counties, Puget Sound, WA	2012	US Geological Survey	Identification and mapping of feeder bluffs in Puget Sound
Eelgrass	Submerged Vegetation Monitoring Project (SVMP)	2004, 2009, 2013	DNR	Eelgrass abundance and depth distribution
	SeagrassNet	2012-current	DNR, PSC	Long-term monitoring program that examines the status and health of seagrass resources at established sites around the world
Kelp	Kelp Monitoring	2001	DNR	Kelp distribution
Forage fish	QMH Herring stock status updates	Ongoing	WDFW	Evaluates status of Pacific herring
	Surf smelt and Pacific sand lance spawning surveys	1988-current	WDFW; PSC	Presence/absence of surf smelt and sand lance spawning on Puget Sound beaches
Salmonids	Habitat Limiting Factors and Reconnaissance Assessment Report	2000	King County, WA State Conservation Committee	Summary of current and past salmonids and habitat conditions for WRIA 9; baseline information for WRIA 9;

Resource	Baseline work	Dates	Conducted by	Description/Further Work
				identifies decline factors in WRIA 9 including data gaps
	Salmonwatchers	2012, 2013	Vashon Nature Center	Observe the presence/absence of salmonids in creeks on Vashon-Maury Island
Birds	Marine Bird Density Atlas	1992 – current	WDFW	Displays distributions and density indices of a subset of the major groups of marine birds and diving waterfowl
	Christmas Bird Count	1999-current	Vashon-Maury Island Audubon Society	Annual census to assess the health of bird populations
	Quartermaster Harbor National Audubon Society Important Bird Area	Designated in 2001	National Audubon Society, WDFW	Establishes/recognizes sites that are essential to one or more bird species for breeding, wintering, or migration
Intertidal	Intertidal Biotic Community Monitoring	1998-current	DNR	Monitoring of intertidal species, particularly invertebrates and intertidal vegetation

Derelict Vessel, Gear and Structure Removal

Derelict or abandoned vessels can be a hazard to navigation, public safety, and the environment. DNR manages the Derelict Vessel Removal Program (DVRP), which provides funding and expertise to assist in removal and disposal of derelict vessels in Washington State. The scope of impacts to the natural environment resulting from derelict vessels is dependent on the size, location, contents and whether the vessel is floating or sunken. They have the potential to impact the reserve area through the release of petroleum products and other contaminants, and by shading or physically damaging aquatic habitat.

Figure 11: The *Murph* being raised and removed from QMH. Courtesy: Melissa Ferris, DNR

The DVRP program has inventoried and removed many derelict or abandoned vessels throughout the reserve area since the program was established in 2003. In addition to 5 vessels that were removed from the reserve in 2014 alone, two vessels over 100ft. have notably been removed and disposed of. The *Cactus*, a 180' buoy tender that was converted to a trash barge, was removed from creosote pilings offshore of the Maury Island Natural Area in 2008. The DVRP funded approximately $1.275 million for removal and disposal of the *Cactus*. In November 2014, a 100 ft. sunken barge, the *Murph*, was raised and removed from the Lost Lake area of QMH. This submerged barge posed a navigation hazard during low tides. Petroleum and asbestos contaminants were contained and properly disposed of during the removal.

A January 2014 inventory that included side-scan sonar analysis documented 11 derelict vessels, 8 of those sunken, within the reserve area. These vessels range from a 45' catamaran to smaller fiberglass fishing or recreational boats. Additional vessels may be removed in the future based on available funding and program prioritization (DNR 2013).

Figure 12: Styrofoam floats removed from QMH. Courtesy: Lisa Randlette, WADNR

In addition to derelict vessels, derelict gear has been removed from the reserve. In June 2013, DNR worked to remove an 11,900 square foot aging derelict net pen from Quartermaster Harbor, illegally moored to three creosote pilings. Also removed were tires and Styrofoam floats that once kept the net pen afloat, now sunken to seabed. A sunken vessel was also removed from beneath the net pen.

During November 2014, the DNR Creosote and Debris Removal Project initiated the removal of approximately 113 derelict creosote pilings along with debris from 5 sites within the aquatic reserve. These sites include areas near Gold Beach, Sandy Shores, Dockton, Northwest Quartermaster Harbor and southwest Quartermaster Harbor.

Outreach and Education

Outreach and educational activities emphasize Maury Island as an environmental aquatic reserve. DNR has begun organizing yearly community beach cleanups and participates in the annual Low Tide Celebration. See Table 4 for a list of current outreach and education activities that take place in or near the reserve.

Figure 13: PSC beach cleanup on the east shore of Maury Island, 2013

Table 4: Outreach and education projects

Outreach Activity	Lead Organization	Dates	Description
Beach cleanups	DNR PSC	2013-current	PSC organized a beach cleanup at Point Robinson in 2013 and 2014 and removed 660lbs of debris.
Coastal Observation and Seabird Survey Teams (COASST)	DNR PSC, citizens	Ongoing	Document the presence/absence of beached birds
Salmonwatchers	Vashon Nature Center	2001-current	Observe presence/absence of salmonids in creeks on Vashon-Maury Island
Bioblitz	Vashon Nature Center	2012-current	Annual 24-hour species count
Sea star wasting disease monitoring	Vashon Nature Center, Vashon Beach Naturalists, and SeaGrant	2014	Citizen science project that monitors the progression of sea star wasting disease on Vashon-Maury Island
Maury Island Low Tide Celebration	Partners include: Point Robinson Lighthouse Keepers, Vashon Beach Naturalists, businesses and DNR	2006-current	This annual event gives the public the opportunity to explore seldom-seen tide pools with trained beach naturalists, and learn about outdoor/nature-oriented organizations
Intertidal interpretive walks & training	Vashon Beach Naturalists		Provides information about Vashon beaches, including four or more low-tide interpretive beach walks each year
Training & education	Vashon-Maury Island Audubon Society	Founded 1989	Training and information programs

Low Tide Celebration

Figure 14: 2013 Low Tide Celebration at Point Robinson

Established in 2007, the Vashon-Maury Island Low Tide Celebration occurs at Point Robinson on Maury Island during some of the lowest tides of the year. Highlights of the annual event include:

- The Blue Heron Canoe Family, paddling their way to Point Robinson to honor this celebration
- Public tours of the Point Robinson Lighthouse from the Head Keeper, Captain Joe Wubbold
- Trained naturalists that teach participants intertidal species and biology

4. Management Guidance

The primary focus in managing the Maury Island Aquatic Reserve is to protect and restore the natural biological communities, habitats, 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 future conditions can be met.

I. 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 defines the future environmental conditions expected at the Maury Island Aquatic Reserve when the management goals and objectives in the plan are achieved.

The Maury Island Aquatic Reserve Management Plan ensures protection of the state-owned aquatic lands in an effort to prevent further habitat degradation. The plan emphasizes protection to reduce current habitat degradation and preserve natural processes that support a healthy nearshore environment. Current and future shoreline restoration efforts may lead to improved spawning and rearing habitat for important fish species such as salmon, herring, surf smelt and sand lance. Protection, enhancement and restoration of important nearshore habitats, including eelgrass and other aquatic vegetation, salt marsh habitat and pocket estuaries, may increase refuge and foraging opportunities for resident and migratory birds and waterfowl. Additionally, a focus on the removal of derelict vessels and structures, creosote logs and pilings, and marine debris, and working collaboratively with existing tenants will enhance the natural habitat and reduce potential contaminants and impacts to native species.

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

Although the Maury Island Aquatic Reserve is established as an environmental reserve, the accessibility of the site provides for environmental education opportunities with the local community, and such opportunities will be supported and fostered. DNR also encourages public access to the reserve, and will partner with groups and adjacent landowners interested in providing access to state-owned aquatic lands.

II. Goals, Objectives and Management Actions

The Maury 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. 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 Maury Island Aquatic Reserve. DNR will work cooperatively with partners and the public to incorporate relevant 'best management practices' into the management of the reserve.

The following management goals have been established for the Maury Island Aquatic Reserve:

1) **Resource protection, enhancement and restoration**: Protect, enhance and restore the integrity of natural nearshore habitats and function of shoreline processes for the benefit of native plants and wildlife.

2) **Monitoring and research**: Gather and assess ecological and human use information to support adaptive management decisions.

3) **Partnerships and environmental education**: Promote stewardship of aquatic habitats and species by providing education and outreach opportunities and promoting coordination and partnerships with other resource managers.

4) **Allowable uses**: Promote sustainable management of uses in and adjacent to the reserve, and minimize impacts to habitats and species.

Goal 1: Resource protection, enhancement, and restoration

Protect, enhance and restore the integrity of natural nearshore habitats and function of shoreline processes for the benefit of native plants and wildlife.

Considerations

Protection, restoration and enhancement projects will contribute to the improvement and recovery of specific aquatic habitats in the reserve. Protection of aquatic resources within the Maury Island Aquatic Reserve is primarily achieved by ensuring that uses of state-owned aquatic lands are compatible with conservation of aquatic resources and do not degrade sensitive and unique aquatic resources within the reserve. 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, and enhancement and restoration activities within the aquatic reserve and adjacent aquatic areas and uplands.

Consistent with WAC 332-30-151 and WAC 332-30-106, conservation activities within DNR designated aquatic reserves must be in agreement with and support the purpose and objectives of the reserve as identified in the management plan. Proposed conservation activities must clearly demonstrate potential to improve the habitat of the reserve. Authorization terms cannot exceed the terms associated with underlying land class (i.e., shorelands, tidelands, bedlands). Projects that restore and protect naturally occurring habitats and functions are preferred within the reserve. Additional preference will be given to projects that demonstrate a connection to conservation activities on adjacent uplands and aquatic lands. Preservation activities will require maintenance, monitoring, reporting, and outreach.

Creation of artificial new habitat that does not naturally occur on the site or replaces one habitat type with another may not meet the goals of the plan. Project proposals of this type would have to demonstrate sound scientific design and fill a critical ecological need in the reserve ecosystem that cannot be provided elsewhere. Despite these constraints, changing environmental conditions and habitat losses in Puget Sound may generate a need for creative habitat restoration on reserves.

Objectives

1.1: **Aquatic vegetation** - Maintain or increase the documented extent and diversity of native aquatic vegetation

Management Actions

a) Collaborate with partners to map the distribution and assess the status of aquatic vegetation (see also Goal 2)
b) Promote and support research projects that focus on possible human impacts to aquatic vegetation, stressor response, and causes of local declines
c) Support actions to improve water quality (see also Objective 1.4)
d) Identify and support enhancement and restoration projects that would benefit aquatic vegetation
e) Ensure new uses and reauthorizations minimize potential impacts and continue working with current tenants to reduce the impacts, such as shading, over time

1.2: **Fish habitat** - Protect fish spawning and rearing habitat, and movement corridors

Management Actions

a) Conduct forage fish beach spawning surveys and collaborate with partners to identify the location, extent and quality of forage fish (e.g., surf smelt, Pacific sand lance) spawning habitat (see also Goal 2)
b) Identify impaired habitats that would contribute to forage fish or salmonid survival if habitat functions were enhanced or restored
c) Develop partnerships to restore salmonid habitat in pocket estuaries and re-establish fish passage at stream mouths
d) Support research or surveys that identify critical habitat areas for rockfish and other demersal fish species in the reserve area
e) Ensure new uses and reauthorizations minimize potential impacts and continue working with current tenants to reduce the impacts over time

1.3: **Waterbird habitat** - Protect nearshore waterbird habitat and maintain undisturbed open water and shoreline habitats where birds can feed, breed, and overwinter

Management Actions

a) Identify and monitor activities that have the potential for disturbing foraging and nesting waterbirds
b) Protect exposed bluffs for nesting birds through collaborative partnerships and voluntary stewardship
c) Protect and restore specialized nearshore habitats, such as mudflats, pocket estuaries and salt marsh, which serve as waterbird 'hotspots'

1.4: **Water quality** - Promote and support collaborations focused on improving water quality that reduce impacts to fish, aquatic vegetation and other sensitive species

Management Actions

a) Inventory stormwater inputs adjacent to the reserve, and identify improved management strategies
b) Collaborate with adjacent land owners and land managers to improve shoreline conditions and minimize potential pollution sources
c) Support King County's efforts to identify and address nearshore and upland sources of nitrogen in Quartermaster Harbor
d) Ensure lessees follow habitat stewardship measures that reduce water quality impacts by removing tires, Styrofoam, and treated wood below the water line over time, adopting the Department of Ecology's Resource Manual for Pollution Prevention in Marinas and develop sewage management plans that include options for disposing wastewater from vessel holding tanks and portable toilets, availability of upland restrooms and location of pumpout facilities
e) Avoid authorizing new uses that could affect water quality and close shellfish beds

1.5: **Nearshore processes and drift cells** - Maintain or enhance the integrity of nearshore processes and proper drift cell function

Management Actions

a) Collaborate with adjacent land owners and land managers to promote voluntary stewardship measures that support proper nearshore processes, such as removal of bulkheads and other shoreline modification
b) Use King County's shoreline modification and drift cell data to identify, prioritize and support opportunities to "soften" shorelines and remove shoreline armoring

1.6: **Land acquisition** - Protect important habitats by partnering with other entities to acquire adjacent tidelands and shoreline property

Management Actions

a) Collaborate with King County, the Vashon-Maury Island Land Trust, local citizens, and other interested parties to establish priorities for habitat acquisition and conservation easements
b) Where acquisition of important aquatic habitat is not possible, work cooperatively with owners of adjacent lands (on a voluntary basis) to identify and address specific habitat restoration and conservation opportunities on their properties.
c) If intertidal areas directly adjacent to and shoreward of the reserve come into state ownership, DNR can choose to include these areas in the aquatic reserve. The new area would be managed according to this management plan.

1.7: **Habitat restoration and enhancement** - Restore and enhance impaired or degraded native nearshore habitat and natural processes to better functioning conditions

Management Actions

a) Partner with various entities like King County, Vashon-Maury Land Trust, Vashon-Maury Audubon Society, Vashon Beach Naturalists, and Puget Sound Partnership to identify restoration needs within the reserve, develop restoration

plans, prioritize projects and help seek funding for their implementation and completion. (Potential restoration projects include increase overhanging riparian vegetation, install large woody debris, and reduce shoreline armoring).

b) Coordinate with the DNR Derelict Vessel Removal Program, DNR Creosote Removal Program, and King County to identify derelict vessels and structures, creosote logs and pilings, and other marine debris that should be prioritized for removal

c) Support ongoing monitoring efforts for survey and control of new *Spartina* and other aquatic nuisance species infestations

Goal 2: Monitoring and Research

Gather and assess ecological and human use information to support adaptive management decisions.

Considerations

Effective adaptive management of aquatic resources within the Maury Island Aquatic Reserve relies on having appropriate data. In order to gauge the success of management actions, the current condition of ecosystem elements needs to be established in baseline inventories and assessments. Through development of the management plan DNR will continue to identify areas where data is not available, current, or complete.

After baseline conditions are identified, monitoring will identify ecological trends to assess whether management actions attain or exceed the goals identified in this plan. DNR will seek to partner with local and state governments, Tribes, universities, non-profit organizations and the local citizen and business community to identify and develop research projects within the reserve.

Objectives

2.1: **Data organization and evaluation -** Create a central database with research, monitoring data, current uses and local knowledge to help guide and evaluate management actions

Management Actions

a) Coordinate with partners to inventory data and identify gaps

b) Coordinate monitoring and research efforts with local and state agencies, local non-profits, universities and citizen science groups

c) Support a collective data repository

2.2: **Assessment, baseline inventory and trend monitoring** – Conduct, facilitate and support inventory and monitoring programs to guide management

Management Actions

a) Collaborate with partners and local organizations to increase inventory and monitoring surveys of conservation targets (aquatic vegetation, forage fish, marine birds, intertidal biota, shoreline processes and fish), and coordinate with land owners to increase access to survey sites

b) Partner with local organizations to establish permanent, long-term intertidal biota monitoring sites within the reserve area

c) Work with community to strengthen the local citizen science network
d) Continue DNR supported forage fish beach spawning surveys to establish temporal and spatial distribution of spawning, and continue providing this information to WDFW to augment the regional forage fish database inventory efforts
e) Continue SeagrassNet quarterly monitoring
f) Inventory stormwater outfalls, tightlines, and other drainages adjacent to the reserve
g) Collect and analyze Baseline Resource Damage Assessment Sediment Samples to determine ambient sediment quality conditions in the event of an oil spill
h) Collaborate with partners to establish monitoring programs to track effectiveness of restoration projects

2.3: **Research -** Promote and support research within the reserve

Management Actions

a) Catalog historical and existing studies, determine data gaps and outline a survey or research plan/schedule
b) Support research that focuses on efficacy and site-comparisons of the aquatic reserve network and other marine protected areas in Puget Sound
c) Support research that focuses on conservation targets
d) Promote and support research that focuses on the effects of climate change (sea-level rise, ocean acidification, changes in water temperature and salinity) on the resources within the reserve

Goal 3: Partnerships and Environmental education

Promote stewardship of aquatic habitats and species by providing education and outreach opportunities and promoting coordination and partnerships with other resource managers.

Considerations

Partnerships with local and state governments, Tribes, universities, non-profit organizations, local citizens, and the business community, and public stewardship are vital to meeting the future desired conditions of the reserve. 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 Maury Island Aquatic Reserve. DNR will also support citizen science opportunities that may benefit the aquatic reserve.

Objectives

3.1: **Partnerships -** Develop partnerships with local and state governments, Tribes, universities, local schools, non-profit organizations, local businesses and citizens to increase the Aquatic Reserve Program's education and outreach capacity, and support enhancement and restoration activities

Management Actions

a) Work cooperatively with partners to develop outreach and education materials and interpretive signage
b) Collaborate with partners to identify and fund potential enhancement and restoration activities that will support the management of the aquatic reserve

3.2: **Public stewardship** - Continue to develop best practices trainings, and education and outreach materials to increase voluntary stewardship measures by reserve users and adjacent land owners

Management Actions

a) Provide information on best management practices and voluntary habitat stewardship measures related to bulkheads, riparian management, septic tanks/fields, docks, and mooring buoys to local residents
a) Partner with local organizations to provide education about upland impacts on shorelines, nearshore environments and water quality (i.e. importance of overhanging riparian vegetation and littoral transport; the impacts of invasive species, impervious surfaces, and stormwater runoff)
b) Partner with King County, WDFW, DOE, and/or the Puget Sound Partnership to provide education, technical assistance, and incentives to shoreline property owners on bulkhead removal and the replacement with soft bank or other alternatives that promote natural processes within or adjacent to the aquatic reserve
c) Identification of opportunities (such as locating funding sources) to link voluntary management of private aquatic lands with the aquatic reserve management

3.3: **Education & outreach** - Increase public awareness of the reserve, and promote and support environmental education and citizen science

Management Actions

a) Collaborate with partners to increase environmental education activities, such as community-focused shoreline stewardship walks, hands-on events, expert speakers, citizen science, and educational opportunities for local primary and secondary school students
b) Incorporate knowledge of archaeological, cultural and historical sites in interpretive material, brochures and factsheets to promote deeper appreciation of the local heritage
c) Support and promote existing outreach events like the Low Tide Celebration, Bioblitz, Christmas Bird Count, and partner with local organizations to plan community events such as trash clean-ups
d) Support signage efforts, and provide funding when possible, at public access points and other areas to convey unique attributes of the reserve and promote conservation ethics and stewardship etiquette of the reserve
e) Enhance the Aquatic Reserves Program website and online resources to provide wider access to information and encourage community feedback
f) Ensure connectivity across the Aquatic Reserve Program so that consistent messages are provided

3.4: **Public access** - Foster sustainable use and public access to state-owned aquatic lands within and adjacent to the reserve

Management Actions

a) Collaborate with public land owners such as King County to help provide safe public access and ADA access where possible
b) Provide information on public access areas, including installation of identification signs
c) Inventory types and impacts of public recreational activities, and work cooperatively to reduce human impacts

Goal 4: Allowable Uses

Promote sustainable management of uses in and adjacent to the reserve, and minimize impacts to habitats and species.

Considerations

The following section outlines the requirements and considerations DNR will follow in reviewing use authorizations for state-owned aquatic lands within and adjacent to the Aquatic Reserve.

DNR's management program includes preventing conflicting land-use activities on state-owned aquatic lands in or near the reserve through actions on new use authorizations and on reauthorizations of existing uses. Leases for activities in conflict with reserve status will not be issued (WAC 332-30-151).The extent of the management will consist of a critical review of lease activities to insure proposed activities or structures will not conflict with the basis for reserve designation (WAC 332-30-151 (6)).

If the designation of this reserve presents a conflict with potential future uses, the Commissioner will make a determination as to which use best serves the public benefit (WAC 332-30-151(4b)).

Habitat Stewardship Measures

Habitat stewardship measures (HSM) are procedures that when put in place on state-owned aquatic lands, will avoid and minimize impacts to important species and habitat and improve and restore habitat conditions. These measures are science-based, site-specific conditions incorporated into new use authorizations or reauthorizations. DNR will work with our lessees on a site-by-site basis to establish the appropriate stewardship measures based on the habit and species that occur and the proposed use of the site. Habitat stewardship measures are updated using new information as it is available.

New Uses

New proposed uses must be consistent with the desired future conditions of the Maury Island Aquatic Reserve, and the Goals and Objectives and the Management Actions of this plan. All proposals will be subjected to a critical review pursuant to WAC 332-30-151 and DNR will, in consultation with the region staff and other agencies, make determinations about the consistency of any proposed uses. If DNR determines the use is appropriate for state-owned aquatic lands,

DNR will work with proponents to identify measures to ensure consistency of the proposed use with Aquatic Reserve objectives.

Existing Use Authorizations

DNR cannot alter the terms and conditions of existing use authorizations without the consent of the tenant or grantee. This management plan does not alter existing contractual rights and obligations of any use authorization. Existing tenants or grantees may continue to conduct their activities in conformance with their current use authorization and in compliance with other local, state and federal regulations. DNR will encourage voluntary and cooperative efforts of existing lessees to implement the elements of this plan and DNR Aquatic Habitat Stewardship Measures.

Reauthorization of existing uses

Consistent with WAC 332-30-151, and agency policy for all applications to use any state-owned aquatic land, DNR will consider an application to reauthorize existing uses within or adjacent to the Maury Island Aquatic Reserve when existing agreements expire. At the time of application for reauthorization, DNR will evaluate whether the applicant's proposal conforms to the criteria specified in this plan. DNR will work with reauthorization applicants to ensure that continued use will comply with the Maury Island Aquatic Reserve Management Plan's Goals, Objectives, and Management Actions and support the desired future conditions.

Consistent with DNR proprietary authority, reauthorizations may include terms requiring monitoring to help identify or reduce uncertainty regarding environmental impacts. This will allow DNR to determine conditions to include in subsequent future use authorizations in order to successfully provide environmental protection for the Aquatic Reserve. If DNR adopts a habitat conservation plan for all state-owned aquatic lands, the agency will also integrate the habitat conservation plan's programmatic measures with the requirements of the Management Plan to address aquatic reserve protection. DNR may require additional measures beyond those required in a habitat conservation plan to provide further protection to conservation targets and habitats at the scale of a shoreline process unit, or shore form. Additionally, DNR will expect cooperation from lessees and the support of other interested parties to enhance the quality of habitat and provide long-term protection to the reserve.

Other Uses

There are potential future authorizations that planners cannot foresee. DNR retains the authority to authorize uses on state-owned aquatic lands within the reserve per WAC 332-30-151. All applications for uses of state-owned aquatic lands within and directly adjacent to the reserve will be subject to the critical review and must demonstrate to DNR that no adverse effects to the conservation targets, listed previously in the plan, and ecosystem goods and services will result from their proposal. All new uses within and adjacent to the Maury Island Aquatic Reserve must be consistent with the Reserve Management Plan Goals, Objectives, and Management Actions.

Commercial and Recreational Fishing

DNR does not manage commercial or recreational fisheries except for the commercial wildstock geoduck fishery. Other commercial and recreational fisheries within the reserve will continue to be managed or co-managed by WDFW and responsible tribal governments.

Objectives

4.1: **Quartermaster Harbor Mooring Buoy Plan** - Continue working with the community and partners to implement the near-term and long-term management recommendations identified in the Quartermaster Harbor Mooring Buoy Plan

Management Actions

a) Develop designated mooring buoy areas as established in the QMH Mooring Buoy Plan
b) Require use of embedded anchors with mid-line floats or recommended DNR habitat stewardship measures
c) Streamline the permitting process by allowing DNR to obtain necessary county, state, and federal permits
d) Designate a navigational channel at Dockton and include a voluntary, no-anchor area.
e) Remove abandoned and derelict buoys
f) Encourage King County Parks or Vashon Parks District to establish public access point in Burton

4.2: **Current authorized use** – Work collaboratively with existing tenants to reduce site-specific adverse impacts over the long-term

Management Actions

a) Work with DNR land managers and existing tenets to ensure major upgrades and retrofits incorporate current applicable habitat stewardship measures
b) Work collaboratively with existing tenets to encourage voluntary stewardship measures that reduce impacts to habitats and species

4.3: **New and unforeseen use** - Evaluate proposed new uses and unforeseen uses (uses not listed in the management plan) to ensure uses authorized on state-owned aquatic lands within the reserve implement actions that primarily serve the purpose of the reserve, and support the desired future conditions, Goals and Objectives

Management Actions

a) Perform a critical review of new use proposals pursuant to WAC 332-30-151 and DNR will, in consultation with region staff and other agencies, make determinations about the consistency of any proposed uses and will work with proponents when possible
b) 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. Aquatic Reserves Program staff, in consultation with region staff will make determinations about the consistency of any proposed uses and will work with proponents when possible.
c) Only allow uses on state-owned aquatic lands within and adjacent to the aquatic reserve if the proposed use supports the Goals and Objectives of this plan and would not result in shellfish harvest closures
d) Ensure new uses are consistent with current and future DNR Aquatic Habitat Stewardship Measures

e) Unforeseen, proposed uses, where potential impacts to ecosystem processes have not been documented in peer reviewed literature, proponents must review the best available science for the type and scale of use, associated impacts and present their findings to DNR

4.4: **Use reauthorization** - Ensure use reauthorization applications comply with management plan Goals and Objectives

Management Actions

a) Applicant proposals must comply with this management plans goals, objectives and desired future condition
b) DNR will consider the following questions when evaluating re-applications from existing authorizations and to determine consistency with this plan:

- Is the authorization in compliance with conditions of federal, state and local laws and permits?
- Is the authorization in good financial and contractual standing with DNR?
- Is the use managed in accordance with this plan and consistent with the Goals, Objectives and desired future conditions of the Maury Island Aquatic Reserve Plan?
- Has the project proponent submitted a plan proposing actions to reduce existing site-specific impacts to specific habitats and species identified for conservation?

c) Ensure uses are consistent with current and future DNR Aquatic Habitat Stewardship Measures
d) DNR will use existing knowledge and science and work with other resource management authorities to identify regulatory and proprietary actions necessary to protect resources

4.5: **Unauthorized use –** Reduce potential impacts of unauthorized use and overwater and in-water structures

Management Actions

a) Inventory unauthorized structures (floats, swim dock, buoys etc.) and determine the possible impacts to habitats and species, whether the use is appropriate for state-owned aquatic lands, and meets the reserve's objectives
b) DNR staff will work cooperatively with the owners to reduce impacts and meet DNR Aquatic habitat stewardship measures so that structures can be authorized and permitted
c) Unauthorized structures that are not able to meet local and state permit terms, are not an appropriate use of state-owned aquatic lands, or are not consistent with the reserve's objectives will not be authorized and must be removed by the owner. DNR may remove the unauthorized use when the owner cannot be identified and funding sources are available.

5. Implementation Guidance

The successful management of the Maury Island Aquatic Reserve requires 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 future development, restoration and protection decisions. To increase collaboration in decision-making, DNR formed a permanent Maury Island Aquatic Reserve Implementation Committee, hereafter referred to as the Implementation Committee, whose purpose is to guide the implementation of this plan and coordinate decisions that will affect the long-term health of resources and ecosystems of the Maury Island Aquatic Reserve.

I. Maury Island Aquatic Reserve Implementation Committee

The Implementation Committee is charged with the cooperative implementation of the Maury Island Aquatic Reserve Management Plan. This may include 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 committee is not required to operate on consensus, and comments from individual committee members are compiled and submitted to DNR for consideration. The Implementation Committee should meet as necessary to help guide the implementation of this management plan. The Implementation Committee is currently comprised of approximately 15 members from a broad spectrum of representation, including:

- Adjacent land owners/residents
- Educational organizations
- Local and State Government
- Local businesses
- Scientific community
- Environmental non-profits
- Tribal government
- Recreational groups

Potential new members will be invited to join the Committee by means of formal invitation, either by email or letters.

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APPENDIX A – Observed Species List

Tables A-1 to A-5 identify the documented flora and fauna within the area of the Maury Island Aquatic Reserve.

The species lists include birds, fish, marine mammals, invertebrates, and intertidal and shallow subtidal marine vegetation. Various organizations and individuals who use the area in and around the Maury Island Aquatic Reserve have identified the species listed below.

These are preliminary species lists, not comprehensive lists. Only species observed and documented by a confirmed source were included.

Species of Concern Status (State and Federal) was obtained from Washington Department of Fish and Wildlife in 2014.

Sources

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13. Vashon Nature Center Bioblitz June 2012- Neill Point
14. Washington Department of Fish and Wildlife
15. Washington Department of Natural Resources
16. The Whale Trail

Table A- 1: Birds Observed in Maury Island Aquatic Reserve

* Species protected by the Federal Migratory Bird Treaty Act
◊ Birds Characteristic of Saltwater Habitat[1]
⊕ Birds Characteristic of Sandy and Gravel Shoreline, Mud Flats and Salt Marshes[1]

Common Name	Scientific Name	State Status	Federal Status	Source
Waterfowl – Anseriformes				
Northern Pintail ⊕	*Anas acuta*		*	1, 9
American Wigeon ⊕ ◊	*Anas americana*		*	1, 9, 12
Green-winged Teal ⊕ ◊	*Anas crecca*		*	1, 9
Blue-winged Teal	*Anas discors*		*	1, 9
Eurasian Wigeon ⊕ ◊	*Anas penelope*		*	1, 9, 12
Mallard ⊕ ◊	*Anas platyrhynchos*		*	1, 9, 12, 13
Greater White-fronted Goose ⊕	*Anser albifrons*		*	1
Lesser Scaup	*Aythya affins*		*	1, 9
Greater Scaup ◊	*Aythya marila*			1, 9, 12
Canvasback	*Aythya valisineria*		*	1, 9
Common Goldeneye ◊	*Becephala clangula*		*	1, 9, 12
Barrow's Goldeneye ◊	*Becephala islandica*		*	1, 9, 12
Black Brant ⊕ ◊	*Branta bernicla*		*	1, 9, 11
Canada Goose ⊕ ◊	*Branta canadensis minima*		*	1, 9, 12
Cackling Goose	*Branta hutchinsii*	Monitor	*	13
Bufflehead ◊	*Bucephala albeola*		*	1, 9, 12, 14
Long-tailed Duck	*Clangula hyemalis*		*	1, 9
Harlequin Duck ⊕ ◊	*Histrionicus histrionicus*		*	1, 9, 12, 14
Hooded Merganser ◊	*Lophodytes cucullatus*		*	1, 9, 12
White-winged Scoter ◊	*Melanitta fusca*		*	1, 9, 12
Black Scoter ◊	*Melanitta nigra*		*	1, 9, 12
Surf Scoter ◊	*Melanitta perspicillata*		*	1, 9, 12
Common Merganser ◊	*Mergus merganser*		*	1, 9, 12
Red-breasted Merganser ◊	*Mergus serrator*		*	1, 9, 12
Ruddy Duck ◊	*Oxyura jamaicensis*		*	1, 9, 12
Loons – Gaviiformes				
Common Loon ◊	*Gavia immer*	Sensitive	*	1, 9, 12, 14
Pacific Loon ◊	*Gavia pacifica*		*	1, 6, 8, 12
Red-throated Loon ◊	*Gavia stellata*		*	1, 9, 12, 14
Grebes – Podicipediformes				

Common Name	Scientific Name	State Status	Federal Status	Source
Clark's Grebe	*Aechmophorus clarkii*			1
Western Grebe ◊	*Aechmophorus occidentalis*		*	1, 3, 9, 12, 14
Horned Grebe ◊	*Podiceps auritus*		*	1, 9, 12
Red-necked Grebe ◊	*Podiceps grisegena*		*	1, 9, 12
Eared Grebe ◊	*Podiceps nigricollis*		*	1, 9, 12
Pied-billed Grebe ◊	*Podilymbus podiceps*		*	1, 9
Albatrosses, Petrels and Allies – Procellariiformes				
Short-tailed Shearwater	*Puffinus tenuirostris*		*	1
Pelicans, Cormorants and Allies – Pelicaniformes				
Brown Pelican	*Pelecanus occidentalis*	Endangered	*Endangered	1, 11
Double-crested Cormorant ⊕ ◊	*Phalacrocorax auritus*		*	1, 9, 12, 13
Pelagic Cormorant ⊕ ◊	*Phalacrocorax pelagicus*		*	1, 9, 12
Brandt's Cormorant ⊕ ◊	*Phalacrocorax penicillatus*		*	1, 9, 12
Herons, Ibises and Allies – Ciconiformes				
Great Blue Heron ⊕ ◊	*Ardea herodias*	Monitor	*	1, 7, 9, 12, 13, 14
Green Heron ⊕	*Butorides virescens*	Monitor	*	1, 9
New World Vultures, Hawks, Flacons and Allies – Falconiformes				
Merlin ⊕	*Falco columbarius*	Candidate	*	1, 9, 12
Peregrine Falcon ⊕	*Falco peregrinus*	Sensitive	*Delisted	1, 9
Bald Eagle ⊕ ◊	*Haliaetus leucocephalus*	Sensitive	*Delisted	1, 9, 12, 13, 14
Osprey ◊	*Pandion haliaetus*	Monitor	*	1, 9, 13
Rails, Cranes and Allies – Gruiformes				
American Coot ⊕ ◊	*Fulica americana*		*	1, 9
Virginia Rail ⊕	*Rallus limicola*		*	1, 9
Shorebirds, Gulls, Auks and Allies – Charadriiformes				
Ancient Murrelet	*Synthliboramphus antiquus*		*	1
Cassin's Auklet	*Ptychoramphus aleuticus*	Candidate	*	1
Spotted Sandpiper ⊕	*Actitis macularius*			1, 9, 12
Black Turnstone ⊕	*Arenaria melanocephala*		*	1, 9
Marbled Murrelet ◊	*Brachyramphus marmoratus*	Threatened	*Threatened	1, 9
Sanderling ⊕	*Calidris alba*		*	1, 9, 12
Dunlin ⊕	*Calidris alpina pacifica*		*	1, 9
Western Sandpiper ⊕	*Calidris mauri*		*	1, 9
Pectoral Sandpiper ⊕	*Calidris melanotos*		*	1, 9

Common Name	Scientific Name	State Status	Federal Status	Source
Least Sandpiper ⊕	*Calidris minutilla*		*	1, 9
Pigeon Guillemot ⊕ ◊	*Cepphys Columba*		*	1, 9, 11, 12, 13
Semipalmated Plover ⊕	*Charadrius semipalmatus*		*	1, 9
Killdeer ⊕	*Charadrius vociferus*		*	1, 9, 12
Wilson's Snipe	*Gallinago delicata*		*	1, 9
Caspian Tern ⊕ ◊	*Hydroprogne caspia*	Monitor	*	1, 9, 12
Herring Gull ⊕ ◊	*Larus argentatus*		*	1, 9
California Gull ⊕ ◊	*Larus califonicus*		*	1, 9, 12
Mew Gull ⊕ ◊	*Larus canus*		*	1, 9, 12
Ring-billed Gull	*Larus delawarensis*			1, 9
Glaucous-winged Gull ⊕ ◊	*Larus glaucescens*		*	1, 9, 12, 13
Heermann's Gull ⊕ ◊	*Larus heermannii*		*	13
Glaucous Gull	*Larus hyperboreus*		*	1, 9
Little Gull	*Larus minutus*		*	1, 9
Western Gull ◊	*Larus occidentalis*		*	1, 9
Bonaparte's Gull ⊕ ◊	*Larus philadephia*		*	1, 9
Franklin's Gull	*Larus pipixcan*		*	1, 9
Thayer's Gull	*Larus thayeri*		*	1, 9
Whimbrel	*Numenius phaeopus*		*	1
Red Phalarope	*Phalaropus fulicarius*		*	1
Red-necked Phalarope ⊕ ◊	*Phalaropus lobatus*		*	1, 9
Wilson's Phalarope	*Phalaropus tricolor*		*	1
Parasitic Jaeger ◊	*Stercorarius parasiticus*		*	1, 9
Common Tern ◊	*Sterna hirundo*		*	1, 9
Lesser Yellowlegs ⊕	*Tringa flavipes*		*	1, 9
Greater Yellowlegs ⊕	*Tringa melanoleuca*		*	1, 9
Common Murre ◊	*Uria aalge*	Candidate	*	1, 9, 12
Kingfishers and Allies – Coraciiformes				
Belted Kingfisher ⊕	*Megaceryle alcyon*		*	1, 9, 11, 12, 13
Flycatchers, Songbirds and Allies – Passeriformes				
American Pipit ⊕	*Anthus rubescens*		*	1, 9
American Crow ⊕	*Corvus brachyrynchos*		*	1, 9, 12,13
Barn Swallow ⊕	*Hirundo rustica*		*	1, 9, 12
Song Sparrow ⊕	*Melospiza melodia*		*	9, 12, 13
Savannah Sparrow ⊕	*Passerculus sandwichensis*		*	1, 9, 12

Common Name	Scientific Name	State Status	Federal Status	Source
Cliff Swallow ⊕	*Petrochelidon pyrrhonota*		*	1, 9
Purple Martin ⊕	*Progne subis*	Candidate	*	1, 9, 12,14
Northern Rough-winged Swallow ⊕	*Stelgidopteryx serripennis*		*	1, 9, 11, 12
Tree Swallow ⊕	*Tachycineta bicolor*		*	1, 9
Violet-green Swallow	*Tachycineta thalassina*		*	1, 9, 11, 13

Table A- 2: Fish Observed in Maury Island Aquatic Reserve

Common Name	Scientific Name	State Status	Federal Status	Source
Toadfishes – Batrachoidiformes				
Plainfin Midshipman	*Porichthys notatus*			8, 10, 11, 13
Ratfishes or Chimaeras – Chimaeriformes				
Spotted Ratfish	*Hydrolagus colliei*			4, 8, 10, 12
Herrings – Culpeiformes				
Pacific Herring	*Clupea pallasii*	Candidate	Species of Concern	2, 3, 7, 10, 12, 14
Cods – Gadiformes				
Pacific Cod	*Gadus macrocephalus*	Candidate	Species of Concern	2, 7, 12
Pacific Tomcod	*Microgadus proximus*			10
Sticklebacks and Seamoths – Gasterosteiformes				
Tube-snout	*Aulorhynchus flavidus*			4, 8, 13
Clingfishes – Gobiesociformes				
Northern Clingfish	*Gobiesox maeandricus*			11
Smelts – Osmerifromes				
Surf Smelt	*Hypomesus pretiosus*			3, 7, 14
Perch-likes – Perciformes				
Pacific Sand Lance	*Ammodytes hexapterus*			4, 8, 12, 14
Slender Cockscomb	*Anoplarchus insignis*			8
High Cockscomb	*Anoplarchus purpurescens*			8
Penpoint Gunnel	*Apodichthys flavidus*			8
Kelp Perch	*Brachystius frenatus*			8
Decorated Warbonnet	*Chirolophis decoratus*			8
Mosshead Warbonnet	*Chirolophis nugator*			8
Shiner Perch	*Cymatogaster aggregata*			4, 8, 10, 12
Striped Seaperch	*Embiotoca lateralis*			7, 8, 10, 12
Bay Goby	*Lepidogobius Lepidus*			10
Snake Prickleback	*Lumpenus sagitta*			4, 10
Blackbelly Eelpout	*Lycodes pacificus*			10
Longfin Gunnel	*Pholis clemensi*			8
Crescent Gunnel	*Pholis laeta*			4, 8, 11
Saddleback Gunnel	*Pholis ornata*			8, 13
Pile Perch	*Rhacochilus vacca*			4, 8, 10, 12
Blackeye Goby	*Rhinogobiops nicholsii*			8
Northern Ronquil	*Ronquilus jordani*			8

Common Name	Scientific Name	State Status	Federal Status	Source
Flatfishes – Pleuronectiformes				
Pacific Sanddab	*Citharichthys sordidus*			8
Speckled Sanddab	*Citharicthys stigmaeus*			8, 10
Flathead Sole	*Hippoglossoides elassodon*			10
Rock Sole	*Lepidopsetta bilineata*			8, 10, 14
Doublelined Tounge	*Paraplagusia bilineata*			8
English Sole	*Parophrys vetulus*			4, 8, 10, 12
Starry Flounder	*Platichthys stellatus*			4, 8, 10
C-O Sole	*Pleuronichthys coenosus*			4, 8
Sand Sole	Psettichthys melanostictus			10
Skates and Rays – Rajiformes				
Longnose Skate	*Raja rhina*			10
Salmons – Salmoniformes				
Cutthroat Trout	*Oncorhynchus clarkia*			2, 5, 14
Chum Salmon	*Oncorhynchus keta*	Candidate	Threatened	2, 5, 7, 14
Coho Salmon	*Oncorhynchus kisutch*			7, 5, 14
Steelhead	*Oncorhynchus mykiss*	None in Puget Sound	Threatened	14
Chinook Salmon	*Oncorhynchus tshawytscha*	Candidate	Threatened	4, 5, 7, 14
Scorpionfishes and Flatheads – Scorpaeniformes				
Northern Spearnose Poacher	*Agonopsis vulsa*			8
Sablefish	*Anoplopoma fimbria*			12
Padded Sculpin	*Artedius fenestralis*			8
Scalyhead Sculpin	*Artedius harringtoni*			8
Roughback Sculpin	*Chitonotus pugetensis*			8
Buffalo Sculpin	*Enophrys bison*			4, 8
Pacific Spiny Lumpsucker	*Eumicrotremus orbis*			11
Red Irish Lord	*Hemilepidotus hemilepidotus*			8
Kelp Greenling	*Hexagrammos decagrammus*			7, 8
Whitespotted Greenling	*Hexagrammos stelleri*			4, 8
Longfin Sculpin	*Jordania zonope*			8
Pacific Staghorn Sculpin	*Leptocottus armatus*			8, 10
Spotted Snailfish	*Liparis callyodon*			8
Sailfin Sculpin	*Nautichthys oculofasciatus*			8
Pygmy Poacher	*Odontopyxis trispinosa*			8

Common Name	Scientific Name	State Status	Federal Status	Source
Lingcod	*Ophiodon elongatus*			7, 8, 12
Painted Greenling	*Oxylebius pictus*			4, 8
Sturgeon Poacher	*Podothecus acipenserinus*			8, 13
Grunt Sculpin	*Rhamphocottus richardsoni*			8, 11
Cabezon	*Scorpaenichthys marmoratus*			4, 7, 8, 12
Brown Rockfish	*Sebastes auriculatus*			4, 8, 12
Copper Rockfish	*Sebastes caurinus*	Candidate	Species of Concern	2, 4, 8, 12
Puget Sound Rockfish	*Sebastes emphaeus*			8
Quillback Rockfish	*Sebastes maliger*	Candidate	Species of Concern	2, 8, 12
Black Rockfish	*Sebastes melanops*	Candidate		8, 12
Vermilion Rockfish	*Sebastes miniatus*			8
Blacktip Poacher	*Xeneretmus latifrons*			8
Bramble, Sleeper and Dogfish Sharks – Squaliformes				
Spiny Dogfish	*Squalus acanthias*			4, 8, 10, 12
Pipefishes and Seahorses – Sygnathiformes				
Bay Pipefish	*Sygnathus leptorhynchus*			10

Table A- 3: Marine Mammals Observed in Maury Island Aquatic Reserve

* Species protected by the Federal Marine Mammal Protection Act

Common Name	Scientific Name	State Status	Federal Status	Source
Carnivores – Carnivora				
Sea Otter	*Enhydra lutris*	Endangered	*Species of Concern	16
Northern Sea Lion	*Eumetopias jubatus*	Threatened	*Species of Concern	16
River Otter	*Lutra Canadensis pacifica*			7, 16
Pacific Harbor Seal	*Poca vitulina richardi*		*	7, 11, 13, 16
California Sea Lion	*Zalophus californianus*		*	13, 16
Porpoises, Dolphins and Whales – Cetacea				
Minke Whale	*Balaenoptera acutorostrata*		*	7, 16
Gray Whale	*Eschrichtius robustus*	Sensitive	*	12, 16
Humpback Whale	*Megaptera novaeangliae*	Endangered	*Endangered	12, 16
Killer Whale, Orca	*Orcinus orca*	Endangered	*Endangered	6, 7, 11, 12, 16
Pacific Harbor Porpoise	*Phocoena phocoena*	Candidate	*	7, 11, 12, 16
Dall's Porpoise	*Phocoenoides dalli*		*	12, 16

Table A- 4: Invertebrates Observed in Maury Island Aquatic Reserve

Common Name	Scientific Name	State Status	Federal Status	Source
Flat Worms - Platyhelminthes				
Giant Flatworm	*Kaburakia excelsia*			5, 11, 12
Segmented Worms - Annelida				
Red Commensal Scaleworm	*Arctonoe pulchra*			13
Polychaete	*Armandia brevis*			15
Bamboo Worm	*Axiothella rubrocincta*			12, 15
Feathery Shipworm	*Bankia setacea*			13
Gallery Worm	*Capitella capitata*			15
Polychete	*Caulleriella apicula*			15
Parchment Tube Worm	*Chaetopterus variopedatus*			5
Polychaete	*Chaetozone acuta*			15
Colonial Tube Worm	*Dodecaceria fewkesi*			8
Northern Feather Duster Worm	*Eudistylia vancouveri*			8, 12, 13, 14
Giant Feather Duster Worm	*Eudistylia polymorpha*			5, 7, 12
Brown Intertidal Spaghetti Worm	*Eupolymnia heterobranchia*			13
Capitellid	*Hemipodia simplex*			15
Polychete	*Rhynchospio glutaea*			15
Bristleworm	*Mediomastus californiensis*			15
Sand Worm	*Nephtys ferruginea*			15
Polychaete	*Neris procera*			15
Polychaete	*Notomastus lineatus*			15
Polychete	*Notomastus tenuis*			15
Spindle-shaped Tubeworm	*Owenia fusiformis*			15
Spionid Worm	*Pseudopolydora kempi japonica*	Invasive		15
Polychaete	*Sabellid* sp.			15
Calcareous Tubeworm	*Serpula columbiana*			13
Calcareous Tubeworm	*Serpula vermicularis*			12
Bristleworm	*Spio filicornis*			15
Glassy Tube Worm	*Spiochaetopterus costarum*			11, 13, 15
Polychaete	*Tharyx parvus*			15
Shell Binder Worm	*Thelepus crispus*			12
Sponges - Porifera				
Breadcrumb Sponge	*Halichondria panicea*			13
Sea Anemones and Allies – Cnidaria				
Many Ribbed Jellyfish	*Aequorea forskalea*			13
Buried Sea Anemone	*Anthopleura artemisia*			5, 11, 12, 15

Common Name	Scientific Name	State Status	Federal Status	Source
Clonal Anemone	*Anthopleura elegantissima*			5, 11, 12, 13, 15
Moon Jelly	*Aurelia labiata*			8, 11
Lion's Mane Jellyfish	*Cyanea capillata*			8, 11
Proliferating Anemone	*Epiactis prolifera*			11, 12, 13, 14
Clonal Plumose Anemone	*Metridium senile*			5, 8, 10
Gigantic Anemone	*Metridium farcimen*			8, 13
Cross Jelly	*Earleria cellularia*			13
Tubedwelling Anemone	*Pachycerianthus fimbriatus*			8, 12
Orange Sea Pen	*Ptilosarcus gurneyi*			8, 12
Crusty Red Anemone	*Urticina columbiana*			11
Christmas Anemone	*Urticina crassicornis*			11, 12
Fish-eating Anemone	*Urticina piscivora*			8
Moss Animals - Bryozoa				
Lacy Bryozoan	*Phidolopora labiata*			8
Spiny-skinned Animals – Echinodermata				
California Sea Cucumber	*Apostichopus californicus*			7, 8, 11, 12, 13, 14
Rose Star	*Crossaster papposus*			4
Red Sea Cucumber	*Cucumaria miniata*			8, 10, 11, 12, 13, 14
Peppered Sea Cucumber	*Cucumaria piperata*			10, 14
Eccentric Sand Dollar	*Dendraster excentricus*			5, 8, 12
Leather Star	*Dermasterias imbricata*			4, 8, 11, 12
White Sea Cucumber	*Eupentacta quinquesemita*			12, 13, 14
Mottled Star	*Evasterias troschelii*			5, 10, 11, 12, 13
Pacific Blood Star	*Henricia leviuscula*			5, 12
Burrowing Sea Cucumber	*Leptosynapta clarki*			11, 15
Vermillion Star	*Mediaster aequalis*			12
Daisy Brittle Star	*Ophiopholis aculeata*			12
Edible Sea Cucumber	*Parastichopus californica*			10
Crescent Sea Cucumber	*Pentamera populifera*			10
Giant Pink Star	*Pisaster brevispinus*			4, 5, 8, 12
Purple Sea Star	*Pisaster ochraceous*			5, 11, 12, 13, 14
Sunflower Star	*Pycnopodia helianthoides*			4, 5, 7, 8, 11, 12, 13
Morning Sunstar	*Solaster dawsoni*			4, 11
Stimpson's Sun Star	*Solaster stimpsoni*			10, 11, 12, 13

Common Name	Scientific Name	State Status	Federal Status	Source
Purple Urchin	*Strongylocentrotus purpuratus*			12
Green Sea Urchin	*Strongylocentrotus droebachiensis*			8, 11, 12, 14, 15
Tunicates - Urochordata				
Glassy Tunicate	*Ascidia paratropa*			12
Transparent Tunicate	*Ciona savignyi*	Invasive		8
Broad Base Sea Squirt	*Cnemidocarpa finmarkiensis*			8
Compound Sea Squirt	*Didemnum vexillum*	Invasive		8, 14
Crustaceans (Barnacles, Crabs and Allies) - Arthropoda, Crustacea				
Crenate Barnacle	*Balanus crenatus*			7, 13, 14
Acorn Barnacle	*Balanus glandula*			5, 7, 11, 12, 13
Giant Acorn Barnacle	*Balanus nubilus*			8
Red Rock Crab	*Cancer productus*			4, 5, 8, 10, 11, 12, 13
Skeleton Shrimp	*Caprellid* spp.			13
Small Brown Barnacle	*Chthamalus dalli*			5, 8, 11, 12, 13
Blacktail Bay Shrimp	*Crangon nigricauda*			13
Shrimp	*Crangon* sp.			10, 13
Hairy Crab	*Hapalogaster mertensii*			12
Purple Shore Crab	*Hemigrapsus nudus*			11, 12
Oregon Shore Crab	*Hemigrapsus oregonensis*			5, 11, 12, 13, 14
Stout Shrimp	*Heptacarpus brevirostris*			11
Shrimp	*Heptacarpus* spp.			12, 13
Tanaids	*Leptochelia dubia*			15
Black-clawed Crab	*Lophopanopeus bellus*			5, 10, 11, 12
Spider Crab	*Maja* sp.			15
Miniature Spinyhead Shrimp	*Mesocrangon munitella*			13
Graceful Rock Crab	*Metacarcinus gracilis*			4, 11, 12, 13
Dungeness Crab	*Metacarcinus magister*			4, 5, 8, 10, 11, 12, 13
Pink Ghost Shrimp	*Neotrypaea californiensis*			12
Graceful Decorator Crab	*Oregonia gracilis*			5, 12
Bering Hermit Crab	*Pagurus beringanus*			12, 15
Greenmark Hermit Crab	*Pagurus caurinus*			11, 13
Grainyhand Hermit Crab	*Pagurus granosimanus*			11
Hairy Hermit Crab	*Pagurus hirsutiusculus*			5, 11, 12, 13
Sidestriped Shrimp	*Pandalopsis dispar*			13

Common Name	Scientific Name	State Status	Federal Status	Source
Dock Shrimp	*Pandalus danae*			8, 10
Spot Prawn	*Pandalus platyceros*			8
Flat Porcelain Crab	*Petrolisthes cinctipes*			5, 12
Flattop Crab	*Petrolisthes eriomerus*			12
Mantle Pea Crab	*Pinnixa faba*			15
Western Pea Crab	*Pinnixa occidentalis*			15
Schmitt Pea Crab	*Pinnixa schmitti*			15
Pea Crab	*Pinnixa* spp.			13
Spider Crab	*Pugettia gracilis*			7
Graceful Kelp Crab	*Pugettia producta*			4, 5, 7, 8, 11, 12, 13, 14
Thatched Barnacle	*Semibalanus cariosus*			5, 7, 11, 12, 13
Helmet Crab	*Telmessus cheiragonus*			4, 11, 12, 13
Isopods and Amphipods - Arthropoda, Isopoda/Amphipoda				
Driftwood Isopod	*Alloniscus perconvexus*			12
Amphipod	*Allorchestes angusta*			15
Amphipod	*Calliopius* spp.			15
Amphipod	*Eogammarus oclairi*			15
Isopod	*Exosphaeroma inornata*			15
Amphipod	*Gammarid* sp.			15
Pillbug Isopod	*Gnorimophaeroma oregonensis*			5, 11, 12, 15
Sea Flea	*Hyale frequens*			15
Brown Isopod	*Idotea urotoma*			5, 12
Sea Slater	*Ligia pallasii*			5, 12
Beach Hopper, Sand Flea	*Orchestia traskiana*			12
Eelgrass Isopod	*Pentidotea resecata*			5, 12
Rockweed Isopod	*Pentidotea wosnesenskii*			5, 11, 13
Isopod	*Sphaeromid* sp.			15
Pacific Beach Hopper	*Traskorchestia traskiana*			13
Clams, Oysters and Allies - Mollusca, Bivalve				
Plain Tellin	*Angulus modesta*			13, 15
Salmon Tellin	*Angulus nuculoides*			15
Spiny Scallop	*Chlamys hastata*			5, 12
Heart Cockle	*Clinocardium nuttalli*			4, 5, 11, 12, 13, 15
Giant Rock Scallop	*Crassadoma gigantea*			8
Pacific Oyster	*Crassostrea gigas*			12
California Softshell Clam	*Cryptomya californica*			12
Wrinkled Rock Borer	*Hiatella arctica*			13
Pacific Littleneck Clam	*Leukoma staminea*			11, 12, 13

Common Name	Scientific Name	State Status	Federal Status	Source
Fine-line Lucine	*Lucina tenuisculpta*			15
Western Ringed Lucine	*Lucinoma annulata*			12
Inconspicuous Macoma	*Macoma inconspicua*			5, 12
Pointed Macoma	*Macoma inquinata*			13, 15
Bent-nose Macoma	*Macoma nasuta*			5, 12, 13
White-sand Macoma	*Macoma secta*			5, 12
Northern Horsemussel	*Modiolus modiolus*			7, 12
Softshell Clam	*Mya arenaria*			5, 11, 12, 13
Northern Bay Mussel	*Mytilus trossulus*			4, 5, 7, 11, 12, 13, 15
Purple Varnish Clam	*Nuttallia obscurata*			15
Olympia Oyster	*Ostrea conchaphila*			12
Pacific Geoduck	*Panopea generosa*			4, 5, 7, 11, 12, 13, 14
Green False-jingle	*Pododesmus macroschisma*			5, 11, 12, 13, 14
Butter Clam	*Saxidomus gigantea*			5, 11, 12, 13, 14, 15
Hooked Surfclam	*Simomactra falcata*			12
Sickle Jackknife Clam	*Solen sicarius*			5, 11, 12, 13
Fat Gaper	*Tresus capax*			11, 12, 13, 15
Pacific Gaper	*Tresus nuttalli*			11
Manila Clam	*Venerupis philippinarum*			5, 11
Rough Piddock	*Zirfaea pilsbryi*			11, 13
Snails and Slugs - Mollusca, Gastropoda				
Brown Spiny Doris	*Acanthodoris brunnea*			12
Shaggy Mouse	*Aeolidia papillosa*			5, 11, 12, 14
Spotted Aglaja	*Aglaja ocelligera*			11, 13
Carinate Dovesnail	*Alia carinata*			13
Striped Nudibranch	*Armina californica*			11, 12
Threaded Bittium	*Bittium eschrichtii*			13
Yellow-edged Cadlina	*Cadlina luteomarginata*			8
Blue Top Shell	*Calliostoma ligatum*			12
Leafy Hornmouth	*Ceratostoma foliatum*			8, 12
Pacific Half-slippersnail	*Crepipatella lingulata*			15
Giant Frond-aeolis	*Dendronotus iris*			8
Ringed Doris	*Diaulula sandiegensis*			14
Rough Keyhole Limpet	*Diodora aspera*			12
White-line Dirona	*Dirona albolineata*			8
Lewis's Moon Snail	*Euspira lewisii*			5, 7, 8, 11, 12, 13, 15

Common Name	Scientific Name	State Status	Federal Status	Source
Oregon Triton	*Fusitriton oregonensis*			8
White Bubble Shell	*Haminoea vesicula*			11
Opalescent Nudibranch	*Hermissenda crassicornis*			8, 11, 12, 13, 14
Banded Chink Snail	*Lacuna vincta*			11, 13, 14
Finger Limpet	*Lottia digitalis*			5, 11, 12, 13
Shield Limpet	*Lottia pelta*			5, 11, 12, 13
Checkered Periwinkle	*Littorina scutulata*			5, 11, 12, 13
Sitka Periwinkle	*Littorina sitkana*			5, 11, 12
Hooded Nudibranch	*Melibe leonina*			11
Pacific Sea Lemon	*Montereina nobilis*			13
Lean Western Nassa	*Nassarius mendicus*			7, 10, 11, 13
Channeled Dogwinkle	*Nucella canaliculata*			12, 13
Frilled Dogwinkle	*Nucella lamellosa*			5, 11, 12, 13, 15
File Dogwinkle	*Nucella lima*			13
Striped Dogwinkle	*Nucella ostrina*			5, 8, 12
Purple Olive	*Olivella biplicata*			8
Barnacle-eating Dorid	*Onchidoris bilamellata*			5, 11, 12, 15
Mask Limpet	*Tectura persona*			11, 13
Plate Limpet	*Tectura scutum*			5, 11, 12, 13
Clown Nudibranch	*Triopha catalinae*			12
Chitons - Mollusca, Polyplacophora				
Giant Pacific Chiton	*Cryptochiton stelleri*			12
Hairy Chiton	*Mopalia ciliata*			5, 12
Hind's Chiton	*Mopalia hindsii*			14
Woody Chiton	*Mopalia lignosa*			5, 11, 12, 13, 15
Mossy Chiton	*Mopalia mucosa*			5, 11, 12, 13
Lined Chiton	*Tonicella lineata*			11, 12, 13
Octopodes and Allies - Mollusca, Cephalopoda				
North Pacific Giant Octopus	*Enteroctopus dofleini*			7, 8, 12
East Pacific Red Octopus	*Octopus rubescens*			12
Stubby Squid	*Rossia pacifica*			11

Table A- 5: Intertidal and Shallow Subtidal Vegetation Observed in Maury Island Aquatic Reserve

Common Name	Scientific Name	State Status	Federal Status	Source
Brown Algaes - Orophyta				
Winged Kelp	*Alaria marginata*			15
Oyster Thief	*Colpomenia bullosa*			13
Seersucker	*Costaria costata*			11, 13
Broad Acid Weed	*Desmarestia ligulata*			13
Maiden's Hair	*Ectocarpus* sp.			5
Rockweed	*Fucus gardneri*			11, 13
Bull Kelp	*Nereocystis luetkeana*			11, 13
Sugar Kelp, Sea Belt	*Saccharina latissima*			4, 7, 11, 13, 14
Wireweed, Japanese Weed, Sargassum	*Sargassum muticum*			7, 11, 13, 15
Whip Tube, Soda Straws	*Scytosiphon lomentaria*			11
Brown Algae	*Scytosiphon simplicissimus*			15
Green Algaes – Chlorophyta				
Green Alga	*Acrosiphonia* spp.			15
Mekong Weed	*Cladophora* sp.			5
Gut Weed	*Ulva intestinalis*			5
Sea Lettuce	*Ulva lactuca*			4, 5, 7, 13
Bright Grass Kelp	*Ulva linza*			5
Red Algaes – Rhodophyta				
Red Algae	*Agardhiella tenera*			7
Beautiful Leaf Seaweeds	*Callophyllis* spp.			13
Turkish Towel	*Chondracanthus exasperatus*			7, 11, 13
Crustous Coralline	*Corallinales* spp.			13
Red Algae	*Gracilaria* spp.			15
Witch's Hair	*Gracilariopsis* spp.			13
Iridea	*Iridaea cordata*			5
Turkish Washcloth	*Mastocarpus papillatus*			7, 11, 13
Iridescent Seaweed	*Mazzaella splendens*			13
Red Algae	*Petalonia fascia*			15
Red Algae	*Pyrioia lanceolata*			5
Lobster Horns	*Polysiphonia* sp.			15
Nori	*Porphyra* sp.			15
Red String Algae, Sea Noodles	*Sarcodiotheca gaudichaudii*			11, 13
Seagrass Kaver	*Smithora naiadum*			5
Vascular Plants – Anthophyta				
Japanese Eelgrass	*Zostera japonica*	Invasive		11, 13, 15
Common Eelgrass	*Zostera marina*			4, 11, 13, 15

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APPENDIX B – Maps

The following maps were created to better inform the management of Maury Island Aquatic Reserve by identifying the species and habitat and environments that exist in and around the reserve. Uses, designations and management of the reserve area are also shown.

State-owned aquatic land is derived from DNR ownership index plates and does not represent actual spatial extent of tidelands and shorelands. Bedlands are not separately represented on this map, however are included within the areas represented by the tideland and shoreland classifications.

Extreme care was used during the compilation of this map to ensure accuracy. However, due to changes in data and the need to rely on outside sources of information, the Department of Natural Resources cannot accept responsibility for errors or omissions, and, therefore, there are no warranties which accompany this material.

The projection is Lambert Conic Conformal. Horizontal control is based on the 1983 North American Datum.

Base Map Data Sources:

Bathymetry and Topography: Finlayson D.P. (2005) Combined bathymetry and topography of the Puget Lowland, Washington State. University of Washington, (http://www.ocean.washington.edu/data/pugetsound/)

Vashon-Maury Island Parks and Natural Areas: King County

Maury Island Aquatic Reserve: DNR

Figure B- 1: Assumed ownership and encumbrance by activity type

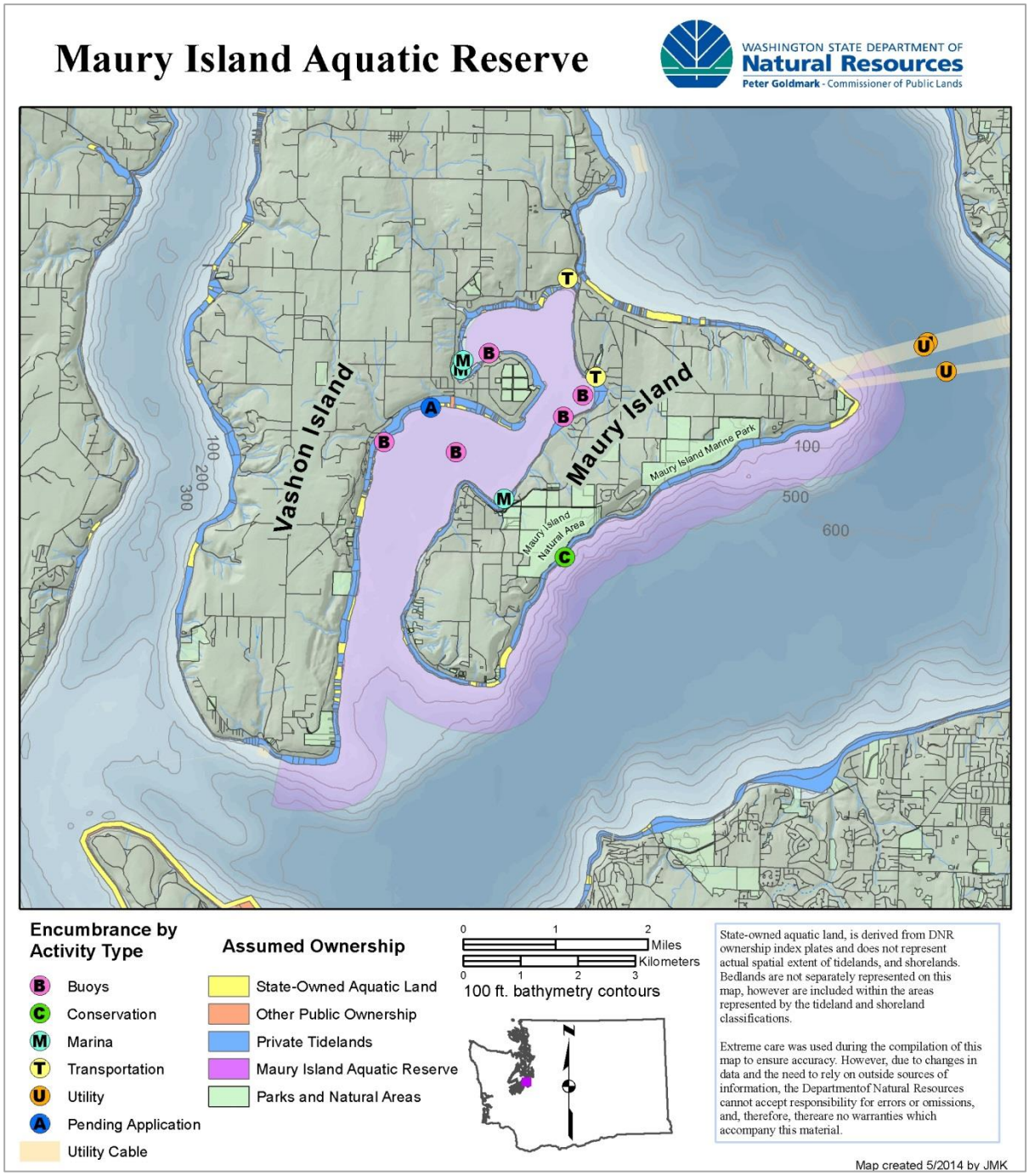


Figure B- 2: Recreation

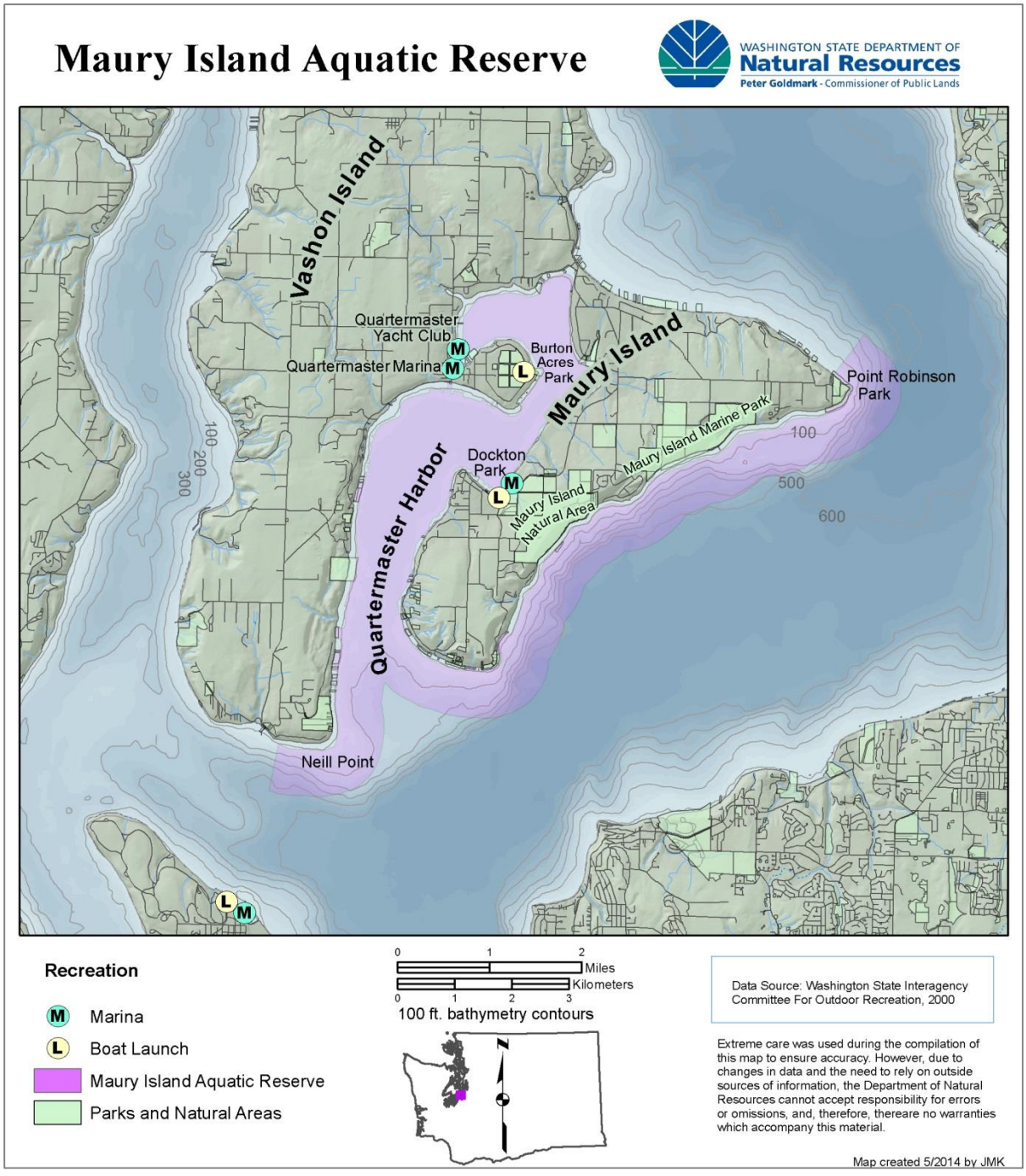


Figure B- 3: Shoreline modification

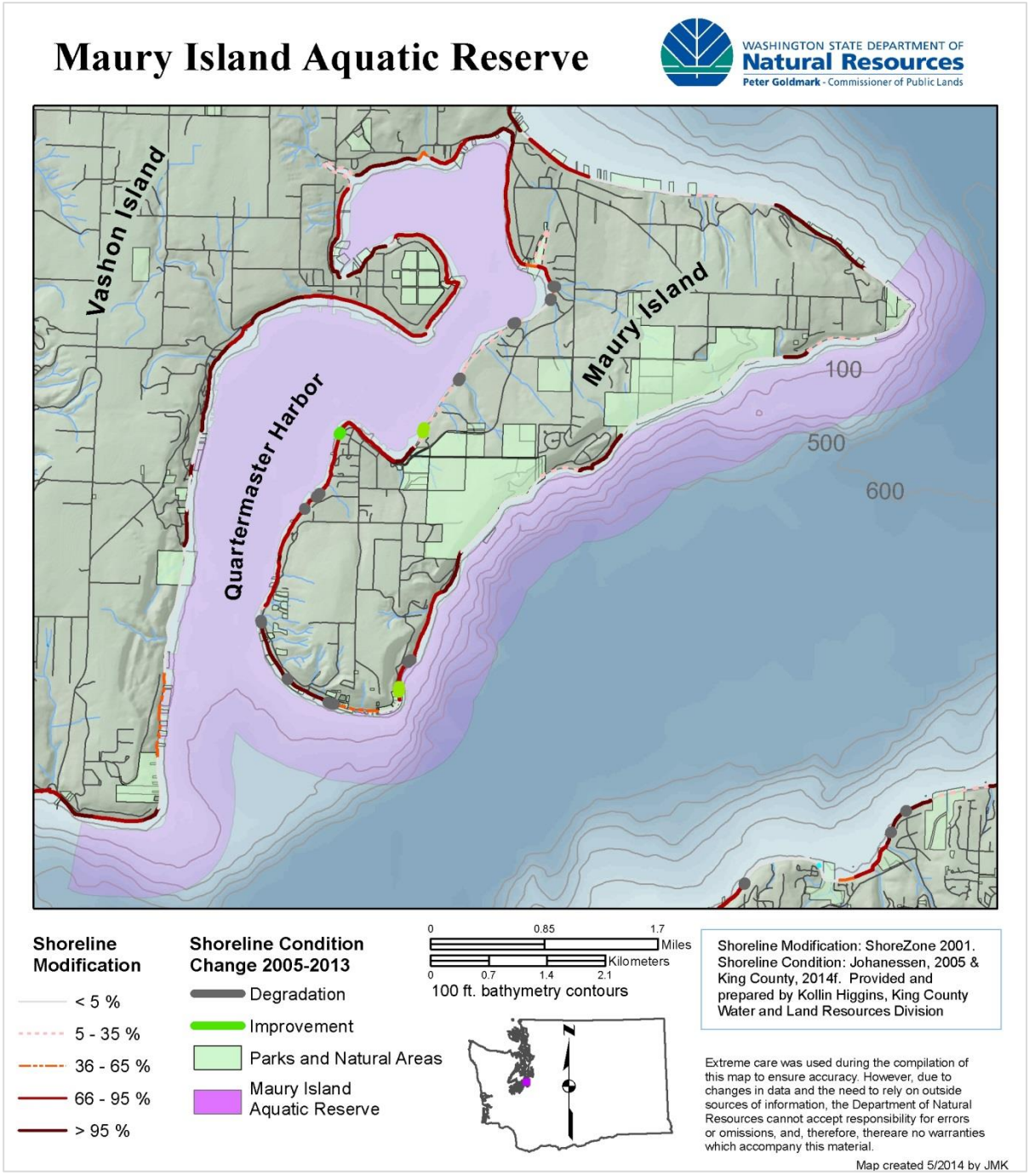


Figure B- 4: Overwater structures

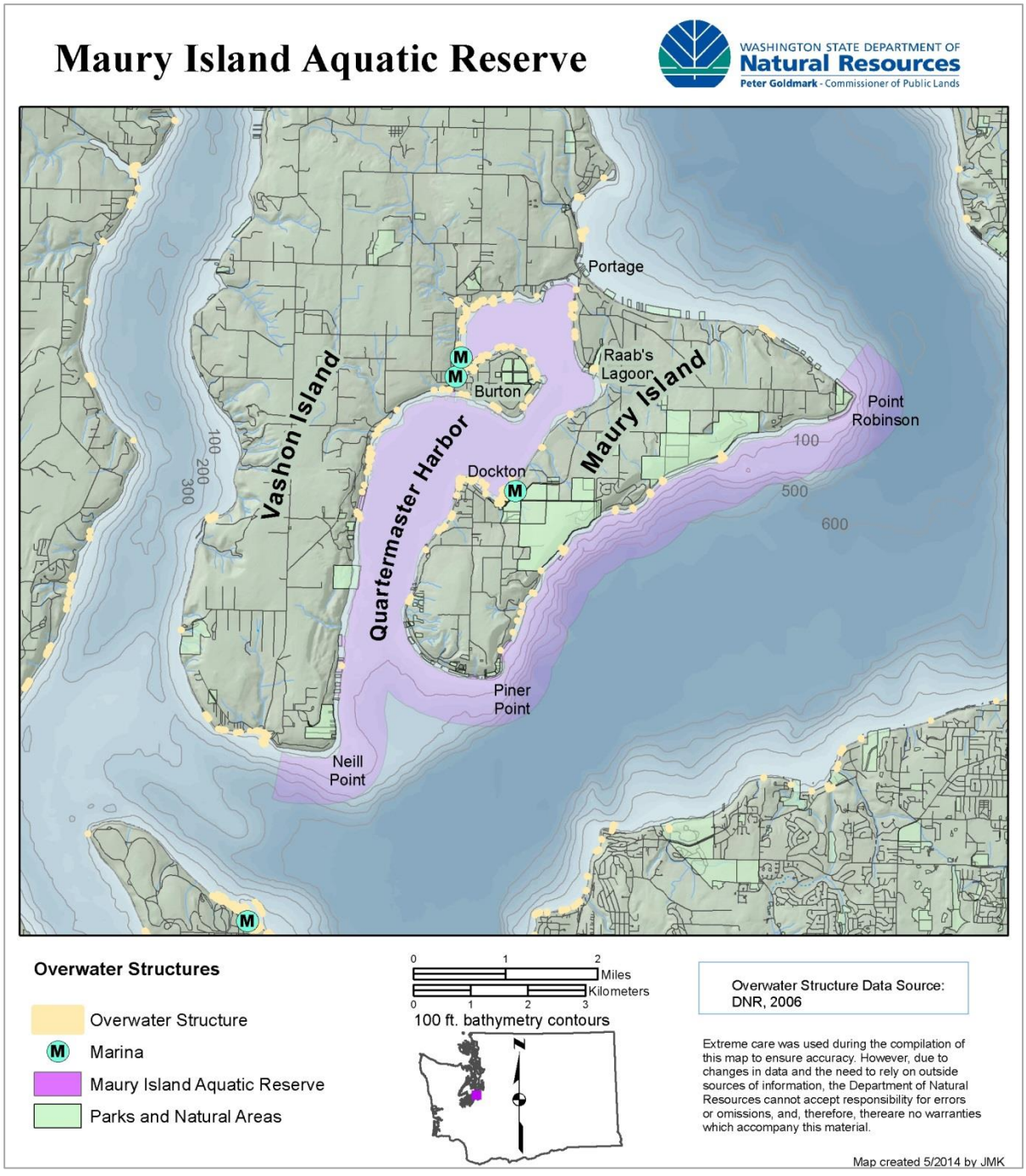


Figure B- 5: Shoreline substrate types

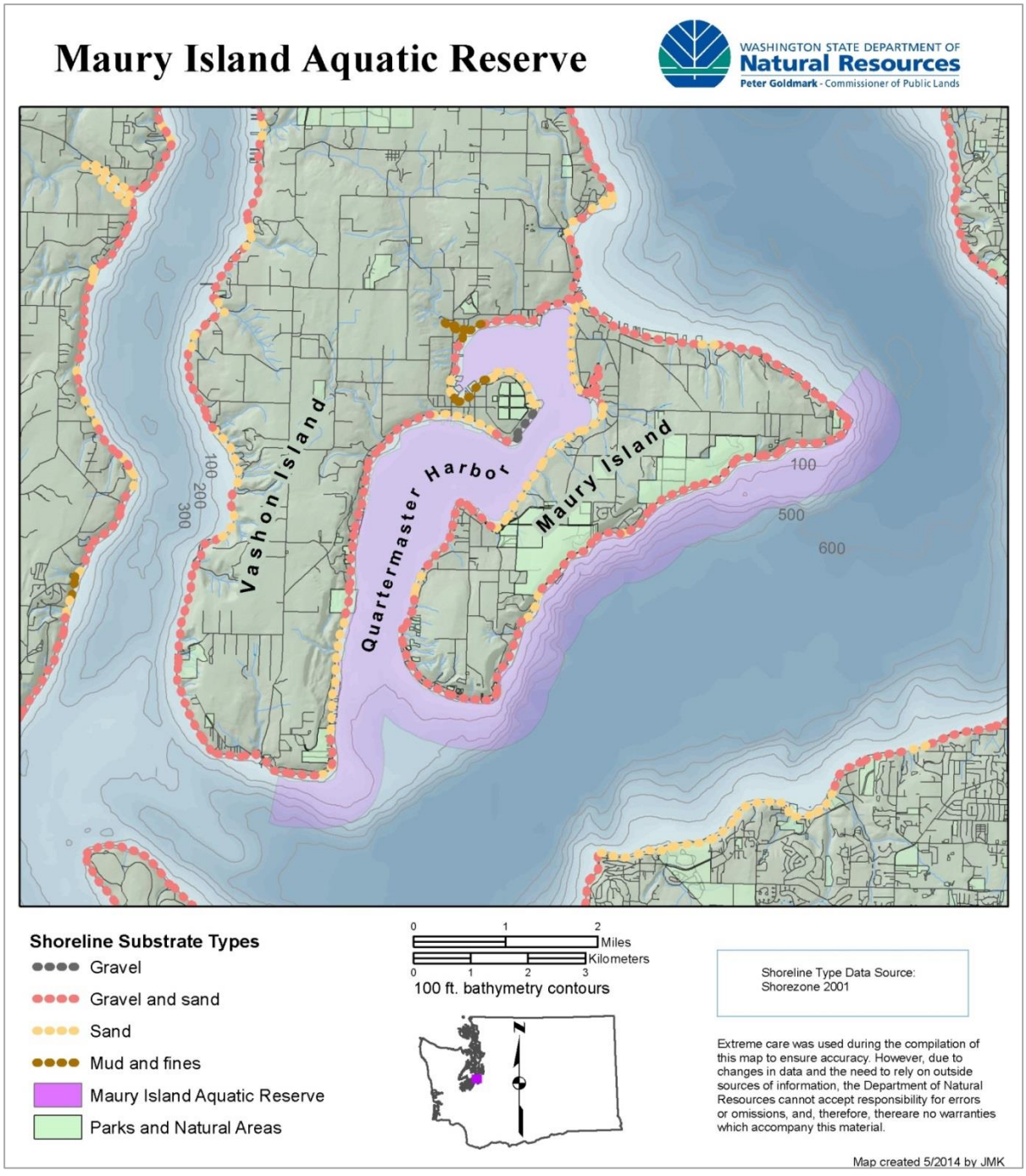


Figure B- 6: Littoral drift

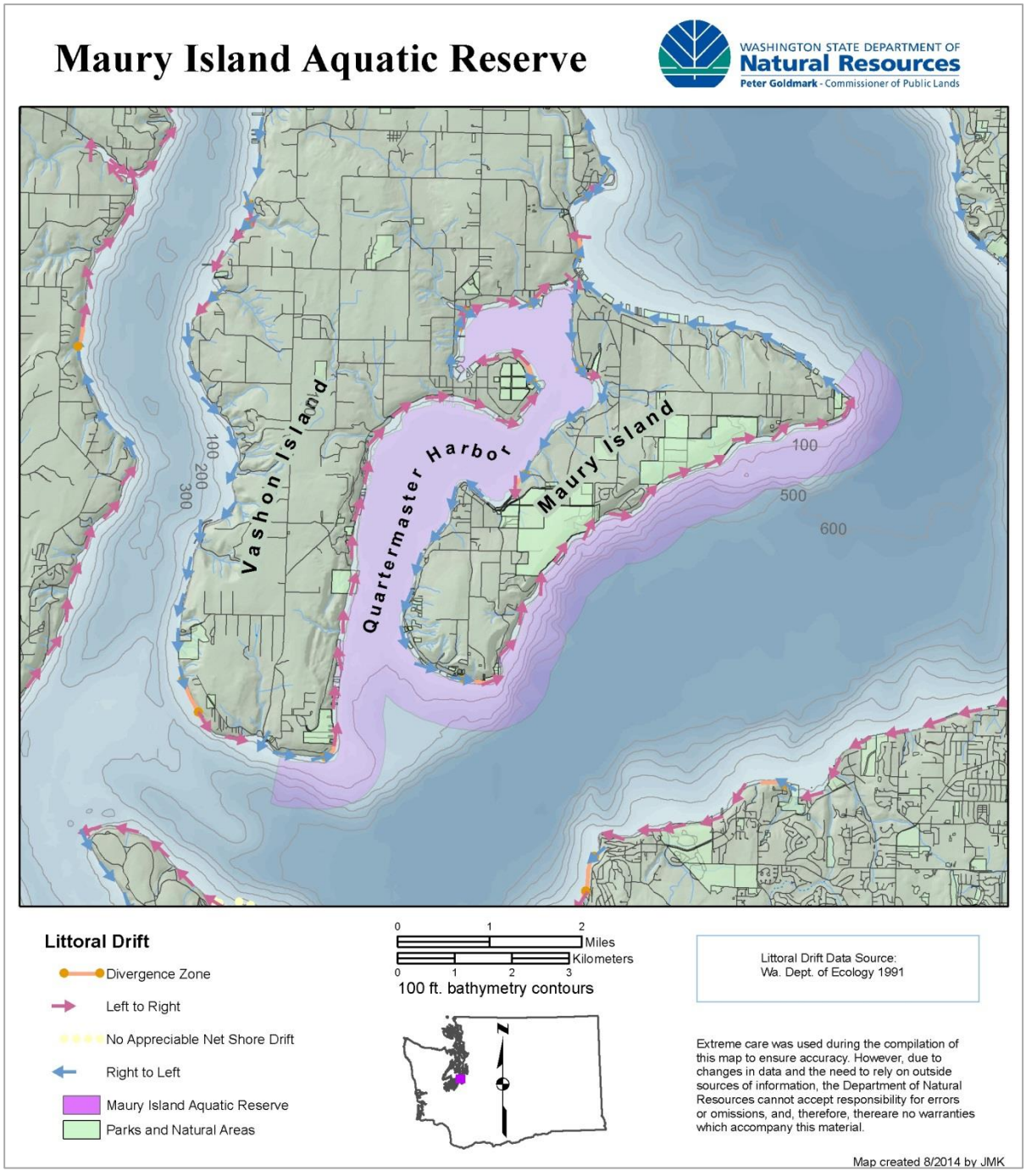


Figure B- 7: Forage fish beach spawning surveys

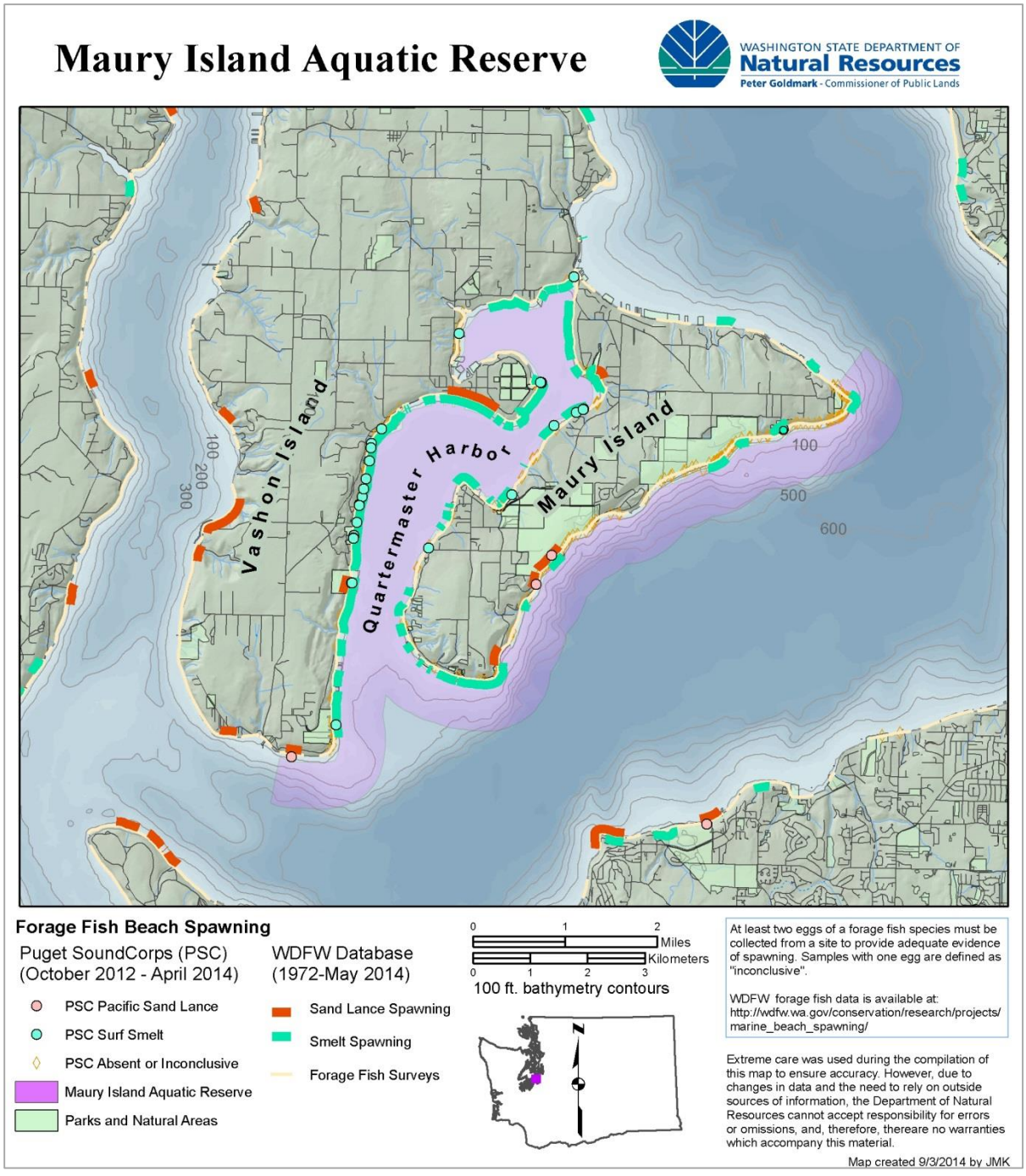


Figure B- 8: Herring spawning habitat

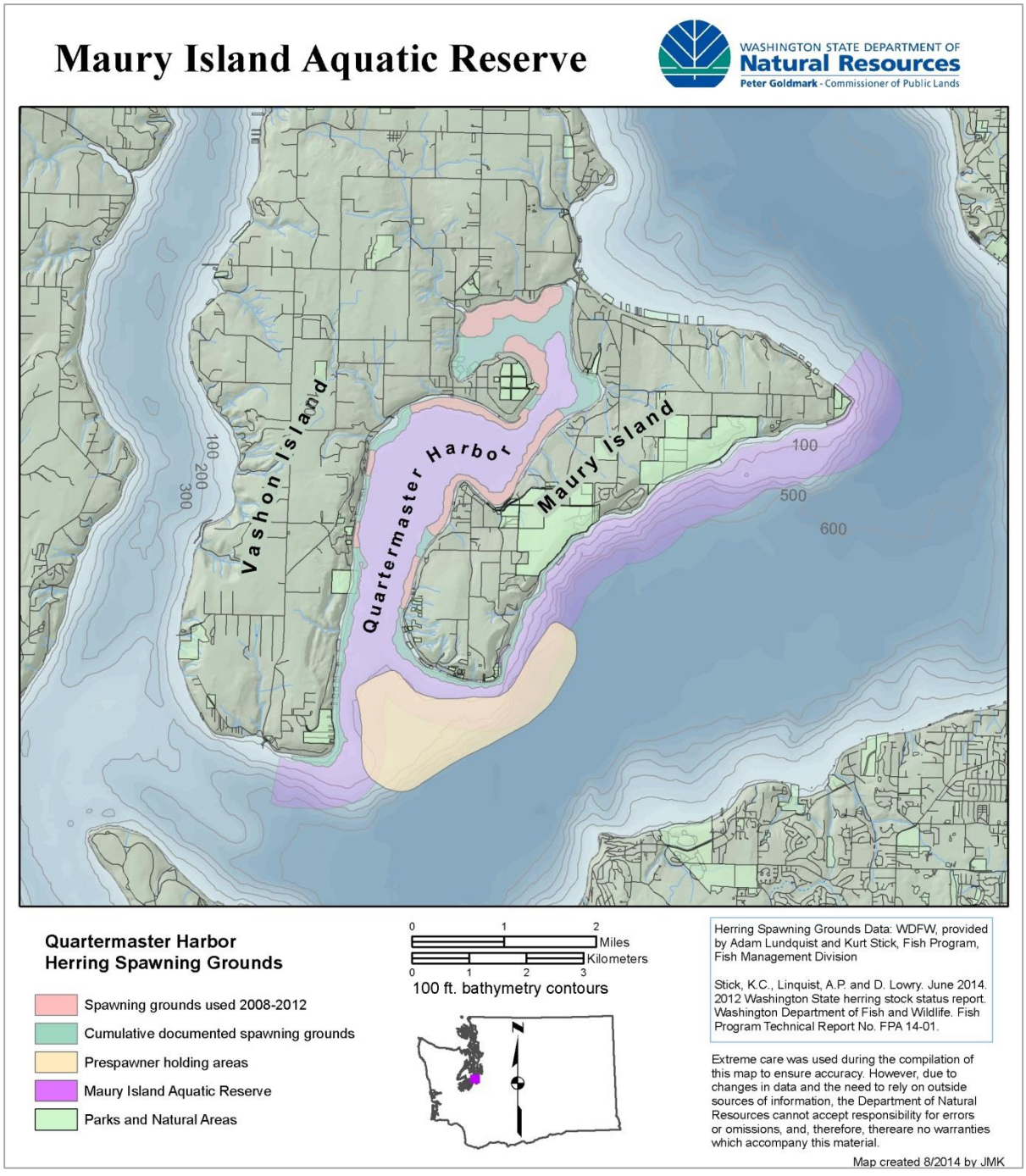
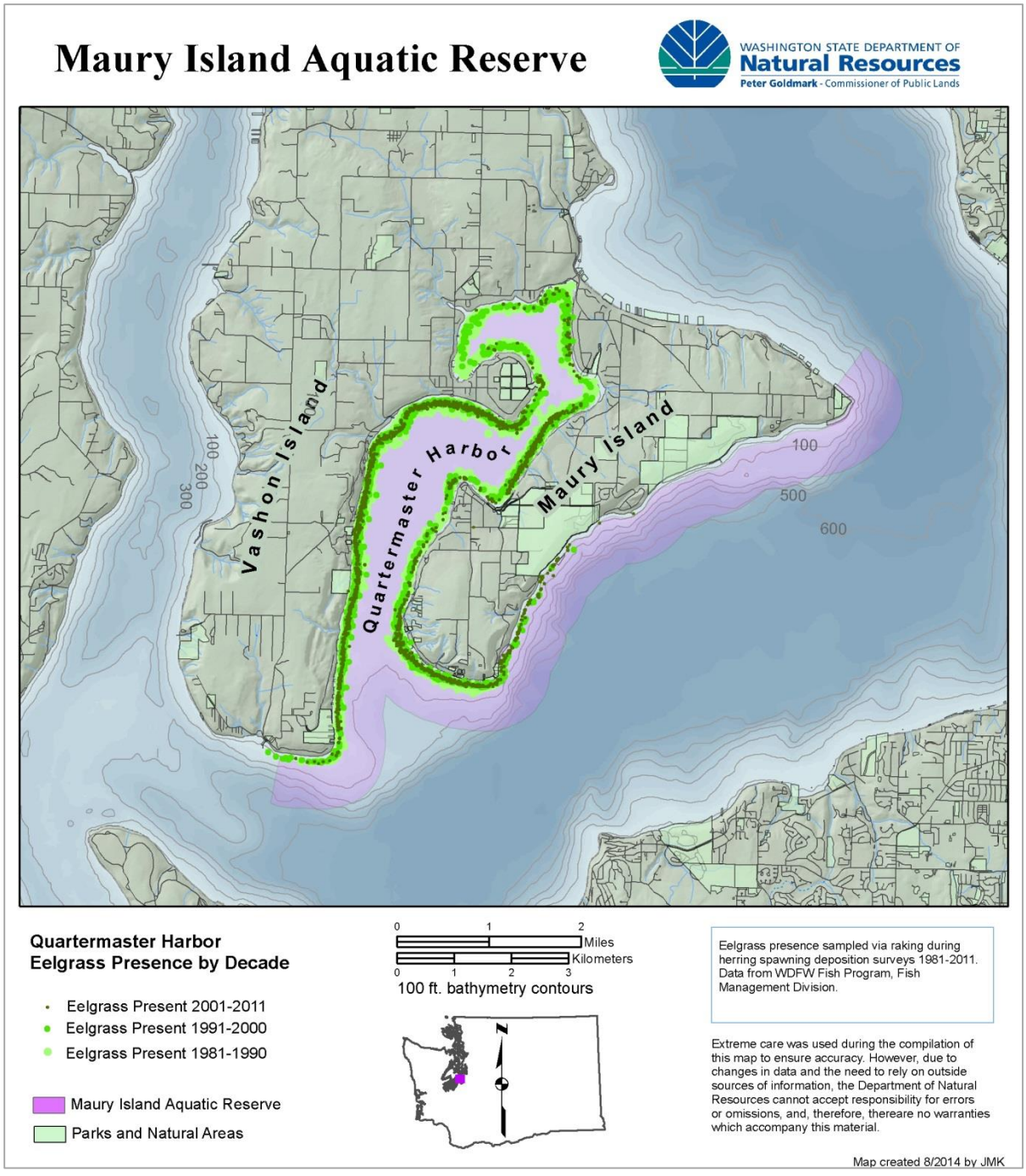
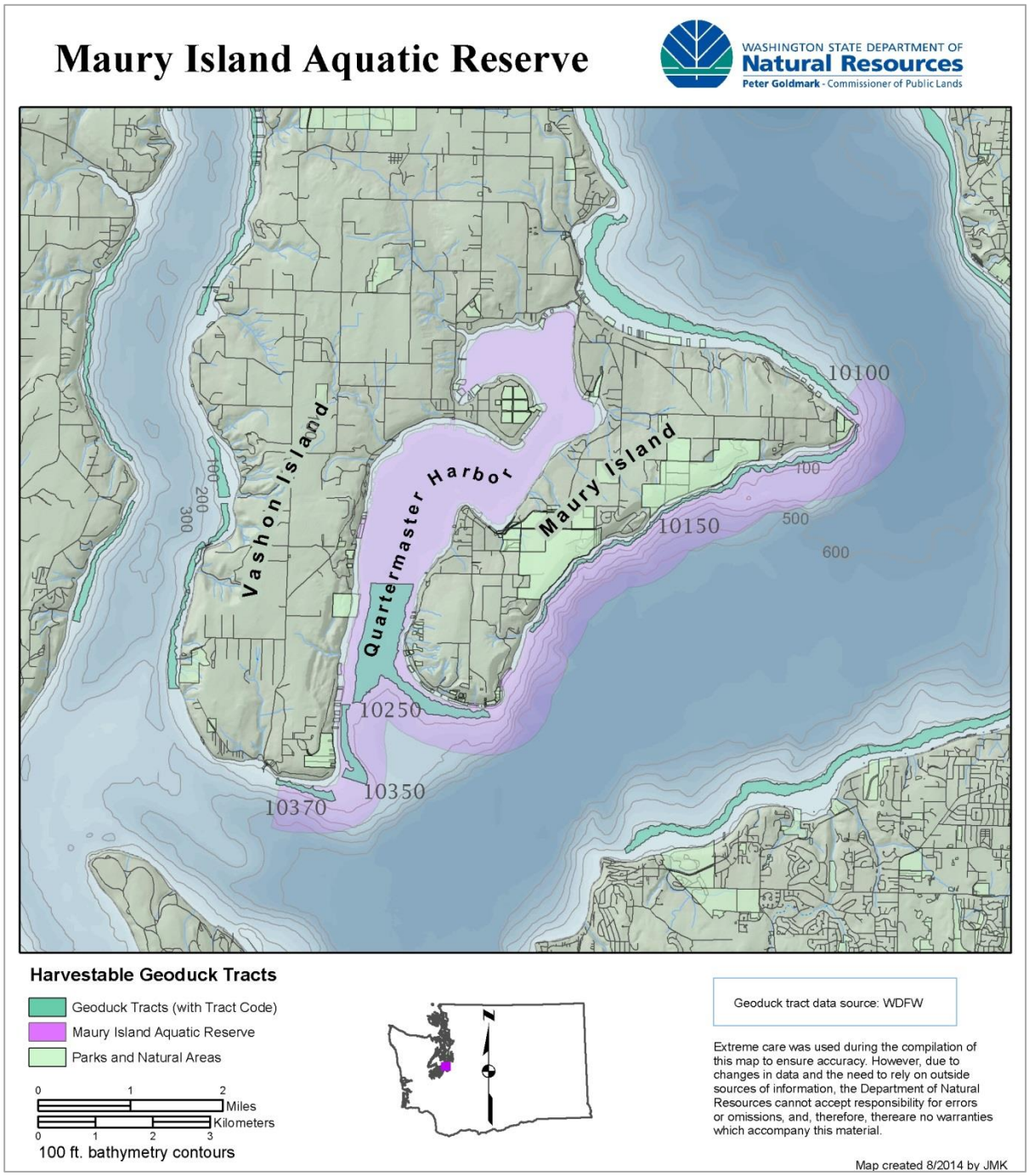


Figure B- 9: Eelgrass distribution



* Please refer to page 19 for a discussion of this data.

Figure B- 10: Geoduck harvestable tracts



APPENDIX C – Withdrawal and Designation Order

COMMISSIONER'S ORDER

STATE OF WASHINGTON 200423
DEPARTMENT OF NATURAL RESOURCES
Doug Sutherland
Commissioner of Public Lands
Olympia, Washington 98504

WITHDRAWAL AND DESIGNATION ORDER
FOR THE MAURY ISLAND ENVIRONMENTAL AQUATIC RESERVE

The State of Washington being the owner of certain aquatic lands consisting of tidelands and bedlands, surrounding Maury Island and including Quartermaster Harbor in King County hereafter described, has found the following attributes that make the Maury Island site unique and critical for conservation:

- The site includes a significant spawning area for a major stock of herring. Quartermaster Harbor represents one of only 18 distinct Pacific herring spawning areas in Puget Sound. Herring are a critical food source for higher predators in the food chain, including salmon. Herring spawn in Quartermaster Harbor and along the southeastern shore of Maury Island. The site also includes a portion of the stock's pre-spawning holding area.
- Quartermaster Harbor is identified by the Washington Audubon Society as an Important Bird Area and in particular an important area for wintering marine birds.
- The eastern shore of Maury Island is included in a unique continuous drift cell (area of mud, sand, or gravel material moved in the nearshore zone by waves and currents) that converges with another drift cell at Point Robinson.
- The habitat diversity of the site is high for the bioregion and includes eelgrass beds, kelp beds, salt marsh, herring spawning grounds, surf smelt spawning grounds, sand lance spawning grounds, Chinook salmon migratory corridors, bull trout migratory corridors, bottom fish rearing habitat, and an important wintering ground for western grebe populations. There are few comparable locations in the bioregion.

And

The Washington State Deparment of Natural Resources is responsible for managing state-owned aquatic lands in a manner that includes:

- Ensuring environmental protection as a management objective for state-owned aquatic lands (RCW 79.90.455(3)), and

- Consideration of natural values of state-owned aquatic lands as wildlife habitat, natural area preserves, representative ecosystems or spawning areas prior to the WDNR issuing any lease or authorizing any changes in use (RCW 79.90.460(3)), and

- Withholding from leasing lands which WDNR finds to have significant natural values (RCW 79.90.460(3)).

Therefore, according to the powers vested in the office of Commissioner of Public Lands (RCW 79.90.455(3), RCW 79.10.210, and WAC 332-30-151), I, Doug Sutherland, hereby order and direct that Washington State tidelands and bedlands described below are withdrawn from general leasing and established as an Environmental Aquatic Reserve.

200423

LEGAL DESCRIPTION

The tidelands and bedlands of navigable waters, owned by the State of Washington, described as follows:

Those tidelands and bedlands surrounding Maury Island, which are fronting and abutting Government Lot 4, excepting there from the west five acres, of Section 14, Sections 20-23, inclusively, and Sections 28-32, inclusively, Township 22 North, Range 3 East, W.M.;

Together with, those tidelands and bed lands lying westerly of said Maury Island which are fronting and abutting only those portions of Sections 9 and 16, which are fronting on Quartermaster Harbor, Township 22 North, Range 3 East, W.M.;

Together with, those tidelands and bedlands lying southerly of said Maury Island, which are fronting and abutting Sections 5 and 6, Township 21 North, Range 3 East, W.M.; and said reserve extends waterward to a water depth of 70 feet below mean lower low water OR one-half mile from the line of extreme low tide, whichever line is further waterward.

Those tidelands and bedlands lying southerly and easterly of Vashon Island, which are fronting and abutting Section 1, Township 21 North, Range 2 East, W.M.;

Together with, those tidelands and bedlands lying easterly of said Vashon Island, which are fronting and abutting Sections 24, 25, and 36 Township 22 North, Range 2 East, W.M.;

Together with, those tidelands and bedlands lying easterly of said Vashon Island, which are fronting and abutting Sections 17-20, inclusively, Township 22 North, Range 3 East, W.M.;

Together with, those tidelands and bed lands lying southerly and westerly of said Vashon Island, which are fronting and abutting only those portions of Section 8, which is fronting on Quartermaster Harbor, Township 22 North, Range 3 East, W.M.; and said reserve extends waterward to a water depth of 70 feet below mean lower low water OR one-half mile from the line of extreme low tide, whichever line is further waterward.

And further, it is

ORDERED AND DIRECTED that the records of the Department of Natural Resources shall note that the property hereafter described possesses unique and significant natural values and shall be managed according to the Maury Island Environmental Aquatic Reserve Final Management Plan (October 29, 2004) for 90-years from the date of signature of this Commissioner's Order.

Management of the site should consider:

- Maintaining pre-existing activities in Quartermaster Harbor and along Maury Island including recreational use, public use, and those activities described in Section 5.2.3 of the management plan. These include Use Authorizations 20-011434; 20-010075; 20-009814; 20-a012778 (application pending); 51-021507, 51-027510, and 51-033836; and 51-075015.
- The evaluation of the proposed mine barging operations along the east-shore of Maury Island in support of the existing King County upland zoning designation for mineral extraction activities, to determine how and if this activity can be conditioned to ensure the conservation of the habitat and features of the site, while primarily serving the objectives of the reserve designation.
- The concerns and interests of adjacent property owners including other public entities, businesses, the Puyallup Tribe, and private property owners.

200423

The Commissioner based this order on the analysis contained in the Final Supplemental Environmental Impact Statement Maury Island Aquatic Reserve issued on October 29, 2004.

The Commissioner has evaluated any potential conflicts between the aquatic reserve and other current or projected uses of the area, and determined that the aquatic reserve best serves the public benefits of the citizens of the State of Washington.

The Commissioner has elected to further evaluate potential economic considerations of aquatic reserve designation at this location. This order is contingent upon this evaluation. The Commissioner expects to complete the economic review within a year of signing this Order. If the Commissioner determines that the aquatic reserve designation should remain in effect after reviewing the economic considerations, or if the economic review is not completed within a year of signature (below), no further action is necessary and this Order remains in full force and effect. If the Commissioner determines the aquatic reserve designation should not remain in effect after reviewing the economic considerations, this Order remains in full force and effect until the Commissioner issues an order to repeal reserve status in accordance with statutes, rules, and guidance applicable to the Aquatic Reserve Program.

This order hereby rescinds the Commissioner's Order concerning the tidelands and bedlands surrounding Maury Island, dated November 17, 2000.

Dated this 8TH day of NOVEMBER, 2004.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

Doug Sutherland
Commissioner of Public Lands

APPENDIX D – List of Existing Use Authorizations within the Reserve Boundary

Grantee	Agreement no.	Use Authorization	Status
King County Parks Department	20-009814	Lease for Marina	Extended
King County	20-B12778	Lease for Conservation	Current
Washington Scuba Alliance	23-084328	Right of Entry for Mooring Buoys	Current
Alan Frost	23-086967	Right of Entry for Mooring Buoy	Current
University of Washington	23-A81825	Right of Entry for Buoy	Current
Puget Sound Energy Inc.	51-021507	Right of Way or Easement for Utility	Current
Puget Sound Energy Inc.	51-027510	Right of Way or Easement for Utility	Current
Comcast of Washington IV Inc.	51-075015	Right of Way or Easement for Utility	Current
Brian Mannix	23-079575	Right of Entry for Mooring Buoy	Current
King County DOT	51-CR0706	Right of Way or Easement for Transportation	Current
Keith Putnam	23-088564	Right of Entry for Mooring Buoy	Current
William and Susan Rowling	20-083928	Lease for Aquaculture	Pending
Polaris Development LLC	20-A10075	Lease for Private Marina	Current
Quartermaster Yacht Club	20-B11434	Lease for Private Marina	Current
Dennis C Davidson	23-088565	Right of Entry for Mooring Buoy	Current
King County	51-CR0207	Right of Way or Easement for Dock	Current
King County Commissioners	51-CR1771	Right of Way or Easement for Transportation	Current